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LAWRENCE W. MILLS, Chicago.....Editor

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Osteopathic Education

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OSTEOPATHIC COLLEGE ENROLLMENT 1955-56

Applications for admission to osteopathic colleges for the academic year starting in the fall of 1955 showed a 22 per cent increase over the applications filed during the preceding year. In the fall of 1955 the total undergraduate enrollment in the six approved osteopathic colleges was 1,882, which is a slight increase over the total enrollment in 1954. There were 520 freshmen who matriculated in the six osteopathic colleges in 1955, a gain of 33 students over the entering class in 1954. Approximately 30 of this year's freshmen had been accepted for admission in 1954 but for financial reasons were unable to enter at that time and requested that they be considered for admission in 1955.

The present junior classes of 442 represent an 11 per cent decrease during the 2 years from their entrance as freshmen in 1953. Nearly all of this decrease occurred at the end of the freshman academic year in the spring of 1954. Six per cent of the freshman classes which were admitted in 1954 dropped out at the end of the freshman year; 3 per cent were academic failures, which is one half of the academic failure percentage of the preceding year. Financial difficulties continue to form the largest single cause of student dropouts.

TABLE I—ENROLLMENT 1955-56

	Freshmen	Sophomores	Juniors	Seniors	Total
CCO	68	51	61	55	235
COPS	96	87	83	80	346
DMS	63	54	50	59	226
KC	103	83	89	103	378
KCOS	103	81	62	73	319
PCO	87	98	97	97	379
	520	454	442	467	1,883

The abbreviations used for the osteopathic colleges in all the tables in this Supplement are as follows:
CCO—Chicago College of Osteopathy
COPS—College of Osteopathic Physicians and Surgeons
DMS—Des Moines Still College of Osteopathy and Surgery
KC—Kansas City College of Osteopathy and Surgery
KCOS—Kirksville College of Osteopathy and Surgery
PCO—Philadelphia College of Osteopathy

GRADUATING CLASSES

In the spring of 1955 the number in the graduating classes, totaling 459, equaled that of the 1953 classes, which represent the largest number of graduates from osteopathic colleges in the last 25 years. The graduating classes in 1956 will show a slight increase, and in 1957 there will be a drop of approximately 30 owing to the size of the present junior classes. Starting in 1958 graduating classes will maintain a steady number of approximately 460.

TABLE II—GRADUATING CLASSES

College	Number of Graduates 1955	Estimated Number of Graduates 1956
CCO	45	55
COPS	77	78
DMS	60	58
KC	97	103
KCOS	92	73
PCO	88	97
Total	459	464

ENROLLMENT SINCE 1946

Table III shows the undergraduate enrollment in the six osteopathic colleges since 1946. The steady flow of veterans of World War II, under the G.I. Bill of Rights (Public Law 346), started in 1946 and reached its peak in 1951 and 1952, when 85 per cent of the osteopathic undergraduate enrollment was made up of ex-service men and women. It will be noticed that the undergraduate enrollment in 1951 of 1,928 students represents the largest number of osteopathic students in the past decade. This is due to the fact that the 1951 enrollment included two graduating classes in two osteopathic colleges. The year 1951 marked the end of the accelerated program which existed during World War II.

TABLE III—ENROLLMENT SINCE 1946

	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955
CCO	77	154	188	215	242	237	240	221	223	235
COPS	194	240	279	336	356	359	348	344	336	346
DMS	104	171	235	264	292	278	254	246	227	226
KC	101	177	223	248	222	318	342	365	366	378
KCOS	141	250	315	386	410	374	368	343	331	319
PCO	204	225	283	329	354	362	365	378	384	379
Total	821	1217	1523	1778	1876	1928	1917	1897	1867	1883

WOMEN STUDENTS IN OSTEOPATHIC COLLEGES

The number of women applicants to osteopathic colleges continues to decline. During the school year 1955-56, there were 43 women enrolled in undergraduate osteopathic education. This represents slightly less than 3 per cent of the entire enrollment. Only 9 women were admitted in the freshman classes in the fall of 1955. Table IV shows the distribution of women students in the various osteopathic colleges by classes.

TABLE IV—NUMBER OF WOMEN IN OSTEOPATHIC COLLEGES, 1955-56

College	Freshmen	Sophomores	Juniors	Seniors	Total
CCO	2	0	2	1	5
COPS	2	3	3	3	11
DMS	0	1	2	1	4
KC	2	4	1	4	11
KCOS	2	0	1	2	5
PCO	1	2	3	1	7
Total	9	10	12	12	43

The study and training required for men and women in osteopathic education are the same. Professional careers in osteopathic medicine result in the same remuneration for women as for men. In the osteopathic profession women occupy high offices in professional organizations and serve on faculties of osteopathic colleges and on hospital and clinic staffs.

Undoubtedly the professions of nursing and teaching today are attracting many women who may have considered a medical career but failed to pursue it because of the length and cost of training. The comparatively new fields of medical technology, occupational

TABLE V—WHERE OSTEOPATHIC FRESHMEN RECEIVED PREPROFESSIONAL TRAINING, FALL 1955

STATE AND COLLEGES	CCO	COPS	DMS	KC	KCOS	PCO	TOTAL
ALABAMA							
Howard College					1		1
University of Alabama					1		1
Total					2		2
ARIZONA							
Arizona State College, Tempe		1					1
Total		1					1
ARKANSAS							
University of Arkansas						1	1
Total						1	1
CALIFORNIA							
Chapman College		1					1
Compton College		2			1		3
East Los Angeles Junior College		1					1
El Camino College		1					1
Fresno State College		4					4
George Pepperdine College		1					1
La Sierra College	1			3			4
Long Beach City College		3					3
Long Beach State College		4					4
Los Angeles City College		4					4
Los Angeles State College		3					3
Loyola University		2					2
Mt. San Antonio College		1					1
Pacific Union College		1					1
San Diego State College		1					1
University of California, Berkeley		2	1				3
University of California, Los Angeles		28					28
University of California, Riverside		1					1
University of California, Santa Barbara		2					2
University of Redlands		1					1
University of Southern California		13		2			15
Whittier College		1					1
Total	1	77	1	5	1		85
COLORADO							
University of Colorado		1			1		2
Total		1			1		2
CONNECTICUT							
University of Bridgeport						1	1
University of Connecticut						1	1
Total						2	2
DELAWARE							0
DISTRICT OF COLUMBIA							
George Washington University				1			1
Georgetown University						1	1
Washington Missionary College				3			3
Total				4		1	5
FLORIDA							
University of Miami				2			2
Total				2			2
GEORGIA							
Emory University					1		1
University of Georgia				2			2
Total				2	1		3
HAWAII							
University of Hawaii					1		1
Total					1		1
IDAHO							0
ILLINOIS							
DePaul University	2						2
Illinois Institute of Technology	1						1
Illinois Wesleyan University	1				1		2
Monmouth College					1		1
Northwestern University	1						1
Roosevelt College	4						4
University of Illinois	1						1
Total	10				2		12

STATE AND COLLEGES	CCO	COPS	DMS	KC	KCOS	PCO	TOTAL
INDIANA							
Anderson College	1						1
Butler University					2		2
Franklin College	1						1
Indiana University	3				1		4
Manchester College					1		1
Purdue University		1			3		4
Total	5	1			7		13
IOWA							
Drake University			3	1			4
Iowa State College			2				2
Iowa State Teachers College			1				1
Iowa Wesleyan College			1		1		2
State University of Iowa			3		2		5
Total			10	1	3		14
KANSAS							0
KENTUCKY							
Eastern Kentucky State College				1			1
Western Kentucky State College					1		1
Total				1	1		2
LOUISIANA							
Tulane University	1			1			2
Total	1			1			2
MAINE							
Colby College					1		1
Total					1		1
MARYLAND							
Morgan State College						1	1
Mt. St. Mary's College					1	1	2
Total					1	2	3
MASSACHUSETTS							
Boston College	1						1
Boston University			1			1	2
Eastern Nazarene College				1			1
Total		1	1	1		1	4
MICHIGAN							
Detroit Institute of Technology	5				1		6
Emmanuel Missionary College			1	1			2
Ferris Institute					2		2
Hillsdale College				1	1		2
Michigan State College	1		2	1	2		6
Michigan State Normal College	1		2	2			5
University of Detroit	1		2		1		4
University of Michigan		1					1
Wayne University	5		11	3			19
Western Michigan College of Education	2						2
Total	15	1	18	8	7		49
MINNESOTA							
College of St. Thomas					1		1
St. John's University					1		1
State Teachers' College, Mankato					2		2
University of Minnesota		1					1
Total		1			4		5
MISSISSIPPI							
Mississippi Southern College		1					1
Total		1					1
MISSOURI							
Central Missouri State College					1		1
Northeast Missouri State Teachers College			1	3	17		21
Rockhurst College				1			1
St. Louis College of Pharmacy			1				1
St. Louis University					1		1
Southeast Missouri State College					1		1
University of Kansas City				5			5
University of Missouri			1	1	1		3
Washington University				1		1	2
Westminster College					1		1
Total			3	11	22	1	37

STATE AND COLLEGES		CCO	COPS	DMS	KC	KCOS	PCO	TOTAL
MONTANA								
Carroll College						1		1
	Total					1		1
NEBRASKA								
Nebraska State Teachers College				1				1
	Total			1				1
NEVADA								0
NEW HAMPSHIRE								0
NEW JERSEY								
Fairleigh-Dickenson College						1		1
Princeton University				1				1
Rutgers University		1				1	1	3
St. Peter's College						3		3
Seton Hall University					5	1	1	7
Upsala College					1		1	2
	Total	1		1	6	6	3	17
NEW MEXICO								
Eastern New Mexico University						1		1
University of New Mexico		1			2	1		4
	Total	1			2	2		5
NEW YORK								
Alfred University						1		1
Brooklyn College					2		1	3
City College of New York			2				1	3
Columbia University		1				2	1	4
Cornell University					1			1
Fordham University		1						1
Hobart College						1		1
Hofstra College							1	1
Ithaca College						1		1
Long Island University		3		7	1	1		12
Manhattan College		1				1		2
New York University			1		2	1		4
Niagara University						1		1
Roberts Wesleyan College					1			1
St. Bonaventure College			1			1		2
St. John's University		7		1			1	9
St. Lawrence University		1				1	1	3
Syracuse University					1			1
Union College				1				1
U. S. Merchant Marine Academy					1			1
University of Buffalo				1	4	3	2	10
University of Rochester		1						1
Utica College				1				1
Yeshiva College					2			2
	Total	15	4	11	15	14	8	67
NORTH CAROLINA								
Guilford College						1		1
	Total					1		1
NORTH DAKOTA								0
OHIO								
Baldwin-Wallace College					1	1		2
Bowling Green State University						1	1	2
College of Steubenville					1			1
Fenn College						1		1
Heidelberg College						1		1
Hiram College						1		1
John Carroll University		1		1	1	1		4
Kent State University		1			1			2
Kenyon College						1		1
Marietta College				1				1
Miami University		1						1
Mount Union College		2						2
Ohio Northern University					1	1		2
Ohio State University		2		1	2	1		6
Ohio University			1					1
University of Akron					1			1
University of Dayton		1			1			2
University of Toledo		3		1				4
Western Reserve University					4	2		6
Wittenberg College			1					1
Youngstown College		2		1	1	2	1	7
	Total	13	2	5	14	10	5	49
OKLAHOMA								
Central State College						3		3
Cameron State Agricultural College					1			1
Oklahoma City University					1			1
University of Tulsa					1			1
	Total				3	3		6
OREGON								
Lewis and Clark College				1				1
	Total			1				1

STATE AND COLLEGES		CCO	COPS	DMS	KC	KCOS	PCO	TOTAL
PENNSYLVANIA								
Albright College					1		2	3
Beaver College						1		1
Bucknell University						1	1	2
Dickinson College							2	2
Duquesne University					1			1
Franklin and Marshall College						1	1	2
Gannon College			1		1			2
Gettysburg College						1		1
Grove City College						1		1
Lafayette College					1		1	2
La Salle College					1		4	5
Lebanon Valley College						1		1
Lincoln University						1		1
Pennsylvania Military College						2		2
Pennsylvania State University			1		1		2	4
Philadelphia College of Pharmacy and Science				1			10	11
St. Joseph's College						1		1
St. Vincent College					1			1
Temple University		1		2	1	1	17	22
Thiel College					1			1
University of Pennsylvania				1	1		4	6
University of Pittsburgh		1		2	2	2	3	10
Ursinus College		1					1	2
Villanova College							2	2
	Total	3	2	6	12	6	57	86
RHODE ISLAND								
Providence College							1	1
University of Rhode Island			1					1
	Total		1				1	2
SOUTH CAROLINA								
Benedict College		1						1
	Total	1						1
SOUTH DAKOTA								
Augustana College						1		1
University of South Dakota				2		1		3
	Total			2		2		4
TENNESSEE								
Memphis State College					1	1		2
Southern Missionary College					1			1
University of Chattanooga							1	1
	Total				2	1	1	4
TEXAS								
Agricultural and Mechanical College of Texas					1			1
East Texas State Teachers College					1			1
Howard Payne College			1					1
North Texas State Teachers College					4			4
Prairie View Agricultural and Mechanical College				1				1
St. Mary's University						1		1
San Antonio College					1			1
Southern Methodist University					2			2
Southwest Texas State College					1			1
Texas Wesleyan College			1					1
Trinity University					1			1
University of Texas					1			1
	Total		2	1	12	1		16
UTAH								
Brigham Young University			1					1
	Total		1					1
VERMONT								
Norwich University				1				1
	Total			1				1
VIRGINIA								
College of William and Mary							1	1
University of Richmond							1	1
	Total						2	2
WASHINGTON								
Central Washington College of Education					1			1
Seattle University			1					1
State College of Washington		1						1
University of Washington				1				1
	Total	1	1	1	1			4
WEST VIRGINIA								
Marshall College						1		1
West Virginia Institute of Technology							1	1
West Virginia Wesleyan College						1	1	2
	Total					2	2	4
WISCONSIN								0
	GRAND TOTALS	68	96	63	103	103	87	520

therapy, medical librarianship, medical recorders, and the many other essential occupations in the healing arts, which are necessary on the health team, are attracting young women who are interested in the healing arts field in general.

Actually the admissions committees of osteopathic colleges report that the ratio between acceptances and applications is higher for women than it is for men.

PREPROFESSIONAL TRAINING OF OSTEOPATHIC FRESHMEN

Table V lists the preprofessional colleges by states where freshmen in 1955 received their required training for entrance into osteopathic colleges. The 520 freshmen represent 204 colleges and universities in 42 states.

STATES LEADING IN NUMBER OF FRESHMEN

Table VI lists those states which lead in the number of freshmen who entered osteopathic colleges in 1955.

TABLE VI—STATES LEADING IN NUMBER OF FRESHMEN, 1955

State	Number of Colleges	Number of Freshmen
Pennsylvania	24	86
California	22	85
New York	24	67
Ohio	21	49
Michigan	10	49
Missouri	10	37

The preprofessional training of 373 freshmen, or 72 per cent of the total freshman classes, was furnished by colleges in these six states. In these states are 54 per cent of the entire osteopathic profession. Five of the six states contain a large number of osteopathic institutions, such as hospitals and clinics, as well as four of the six osteopathic colleges.

During the past 10 years many state osteopathic organizations have established student selection committees, made up of representatives of the profession, who cooperate with the various osteopathic college admissions committees and the Office of Education of the American Osteopathic Association. Members of these committees assist the premedical committees of their local colleges and universities in the counseling, guidance, and selection of students who express an interest in osteopathic medicine. Such committees have been reorganized during very recent years in New York and Ohio. The student selection and recruiting activities of these two committees are responsible to a large degree for the large increase of entering students from those two states.

Table VII shows the states leading in the number of freshmen in osteopathic colleges in the fall of 1954.

TABLE VII—STATES LEADING IN NUMBER OF FRESHMEN, 1954

State	Number of Colleges	Number of Freshmen
Pennsylvania	27	97
California	24	94
Michigan	10	54
New York	12	42
Missouri	7	34
Ohio	17	29

Table VIII lists the number of preprofessional colleges and states represented in the freshman classes of the six osteopathic colleges.

TABLE VIII—REPRESENTATION OF PREPROFESSIONAL COLLEGES AND STATES IN FRESHMAN CLASSES, 1955

College	Freshman Enrollment	Number of Colleges Represented	Number of States Represented
CCO	68	40	13
COPS	96	39	14
DMS	63	36	15
KC	103	67	19
KCOS	103	70	26
PCO	87	48	14

PREPROFESSIONAL COLLEGES TRAINING LARGEST NUMBER OF FRESHMEN

Table IX lists the five preprofessional colleges which trained the largest number of freshmen entering osteopathic colleges in the fall of 1955. For comparative purposes. Table X lists the five colleges which trained the largest number of freshmen entering osteopathic colleges in the fall of 1954.

TABLE IX—PREPROFESSIONAL COLLEGES TRAINING LARGEST NUMBER OF FRESHMEN, 1955

College	State	Number of Freshmen
University of California, Los Angeles	California	28
Temple University	Pennsylvania	22
Northeast Missouri State Teachers College	Missouri	21
Wayne University	Michigan	19
University of Southern California	California	15

TABLE X—PREPROFESSIONAL COLLEGES TRAINING LARGEST NUMBER OF FRESHMEN, 1954

College	State	Number of Freshmen
Temple University	Pennsylvania	27
University of Southern California	California	18
University of California Los Angeles	California	17
Wayne University	Michigan	17
Northeast Missouri State Teachers College	Missouri	17

It is interesting to note that 20 per cent of the entire freshman classes receive their training in the five institutions listed in the above tables. The University of California at Los Angeles and the University of Southern California are in the immediate vicinity of the College of Osteopathic Physicians and Surgeons in Los Angeles. Annually students from these two universities and other colleges in the Los Angeles area visit the osteopathic college there.

Strong relationships exist between the administrative staff of Temple University and the administrative staff of the Philadelphia College of Osteopathy. The Philadelphia College of Osteopathy also sponsors a "Preosteopathic Day" at regular intervals, to which are invited the premedical advisers and undergraduate students from the universities and colleges within the Philadelphia area.

Excellent relationship exists between the faculty of the Kirksville College of Osteopathy and Surgery and the faculty members of the Northeast Missouri State Teachers College in Kirksville, Missouri. Seven years ago an official preosteopathic course was established in the Northeast Missouri State Teachers College, which makes it possible for students after completing 3 years of such a course to receive their baccalaureate degrees following completion of their

osteopathic college work. It is pointed out, however, that most of the students entering osteopathic colleges from Northeast Missouri State Teachers College complete the 4 years required for a baccalaureate degree prior to entrance. Preosteopathic students in this college come from many states in the Union.

TABLE XI—GEOGRAPHICAL DISTRIBUTION OF OSTEOPATHIC STUDENTS, 1955

State or Country	CCO	COPS	DMS	KC	KCOS	PCO	Total Students	Total D.O.'s
Alabama	1						1	5
Arizona			1	3			4	99
Arkansas	1			1	1		3	26
California	2	307	5	31	3		348	2,100
Colorado	2	1	1	4	1		9	205
Connecticut	1	2		3	1	5	12	69
Delaware			1		1	2	4	21
Dist. of Columbia				2	1	1	4	18
Florida	2		4	8	8	1	23	308
Georgia			1	3	1	1	6	70
Hawaii	2	2	1		2		7	11
Idaho					1		1	47
Illinois	35	2	1	8	11		57	398
Indiana	12		1	3	11		27	161
Iowa	1		24	4	9		38	474
Kansas	1			17	2		20	221
Kentucky	1			6	3		10	41
Louisiana							0	17
Maine	1				4	2	7	217
Maryland	1			4	1	3	9	23
Massachusetts	1	1	1	3	3	5	14	267
Michigan	69	1	72	34	46		222	1,198
Minnesota	1		1		8		10	90
Mississippi		1		2	1		4	7
Missouri			4	43	29		76	1,167
Montana			1	1	1		3	52
Nebraska			1	2	3		6	68
Nevada							0	24
New Hampshire		1	2				3	22
New Jersey	6	1	7	22	13	55	104	375
New Mexico	1			2	3		6	105
New York	33	7	18	41	49	55	203	486
North Carolina	1			1			2	39
North Dakota				1	1		2	16
Ohio	25	2	28	24	30	7	116	714
Oklahoma			1	16	5		22	351
Oregon		1	1	5	2		9	133
Pennsylvania	13	5	28	31	33	230	340	1,168
Rhode Island	2	1	1	2	1	7	14	76
South Carolina					1		1	13
South Dakota			3	2	2		7	52
Tennessee	3			4	2		9	67
Texas		1	2	33	5		41	586
Utah							0	27
Vermont							0	35
Virginia				1		2	3	36
Washington	7	4	4	2	4		21	157
West Virginia	2			2	11	3	18	118
Wisconsin	6		3	1	1		11	166
Wyoming							0	17
Canada	1		2	1	2		6	119
China				1			1	0
Cyprus					1		1	0
El Salvador				1			1	0
Ethiopia			1				1	0
Himalaya			1				1	0
Iran		5	1	1			7	0
Iraq					1		1	0
Israel				1			1	0
Korea		1					1	0
Malaya				1			1	0
Panama			1				1	0
Puerto Rico			1				1	0
Trinidad			1				1	0
West Africa	1						1	1
Other Foreign Countries								82
Totals	235	346	226	378	319	379	1,883	12,365

Wayne University for many years has prepared a large number of students who enter osteopathic colleges. This is due to the unusually good relationships between the faculty and administrative staff of Wayne University and members of the osteopathic student selection committee in Detroit. The development of large, strong osteopathic hospitals in Detroit and its immediate area, which have been approved as teaching hospitals, also is responsible for the many students from Detroit colleges and universities who enter osteopathic colleges each year.

GEOGRAPHICAL DISTRIBUTION OF OSTEOPATHIC STUDENTS, 1955

Table XI shows the geographical distribution of the entire osteopathic undergraduate enrollment according to their residence and the osteopathic college which they are attending in relation to the total number of osteopathic physicians located in the various states.

LENGTH OF PREPROFESSIONAL TRAINING

Tables XII and XIII show the length of preprofessional training which the matriculants into osteopathic colleges had completed upon entrance in 1954 and 1955.

TABLE XII—LENGTH OF PREPROFESSIONAL TRAINING OF OSTEOPATHIC MATRICULANTS, FALL OF 1955

	3 years	3+ years	Degree	Advanced Degree	Total
CCO	7	9	46	6	68
COPS	15	15	60	6	96
DMS	6	6	51	0	63
KC	9	16	72	6	103
KCOS	12	17	74	0	103
PCO	7	9	67	4	87
	56	72	370	22	520
			75%		

TABLE XIII—LENGTH OF PREPROFESSIONAL TRAINING OF OSTEOPATHIC MATRICULANTS, FALL OF 1954

	2 yrs.	2+ yrs.	3 yrs.	3+ yrs.	Degree	Advanced Degree	Total
CCO	0	0	6	15	38	2	61
COPS	0	0	11	22	54	6	93
DMS	0	0	9	5	43	1	58
KC	0	0	4	13	57	5	79
KCOS	0	0	12	20	61	3	96
PCO	3	8	2	7	78	2	100
	3	8	44	82	331	19	487
					72%		
			98%				

All osteopathic colleges require a minimum of 3 years of preprofessional college training. The entering classes in 1955 show the largest number of baccalaureate degrees in the history of osteopathic education. Seventy-five per cent of these students had earned their A.B. or B.S. degrees prior to entrance.

The Bureau of Professional Education and Colleges of the American Osteopathic Association and the American Association of Osteopathic Colleges emphasize a good background of English and general education, in addition to the prerequisite courses in the fields of chemistry, biology, and physics. The average student who is interested in the healing arts in general is apt to be one who primarily is interested in science. Many students make up their minds to become physi-

cians during their high school courses in biology or chemistry and upon entering undergraduate college naturally pursue their primary interest, which, in most cases, is a scientific one.

It is natural for the preprofessional student contemplating entering one of the healing arts to choose science, whether chemistry or biology or a combination of both, as one of his majors. In most undergraduate colleges and universities, strong courses in English, foreign language, and the humanities are required for graduation.

The average entering freshman in osteopathic colleges in 1955 had completed 114 semester hours, including 25 semester hours of chemistry, 24 semester hours of biologic science, 8 semester hours of physics, and 12 semester hours of English. The average osteopathic freshman, therefore, has spent exactly one half of his time in the field of science and one half of his time in English and the humanities during his preprofessional college work.

COMBINED DEGREES

Many students entering osteopathic colleges are interested in securing a B.A. or B.S. degree either before matriculating in the professional school or after completing the first year in the osteopathic college. A number of colleges of arts and sciences have agreed to confer the baccalaureate degree upon their students who do satisfactory work for 3 years and then successfully complete their first year in an approved osteopathic college.

In recent years the combined degree has been granted to students who have completed their first year's work in an osteopathic college by the following colleges and universities:

George Pepperdine College, Los Angeles, California
Roosevelt College, Chicago, Illinois
Iowa Wesleyan College, Mount Pleasant, Iowa
St. Ambrose College, Davenport, Iowa
Albion College, Albion, Michigan
Alma College, Alma, Michigan
Central Michigan College of Education, Mount Pleasant, Michigan
Hillsdale College, Hillsdale, Michigan
Michigan State College, East Lansing, Michigan
Western Michigan College of Education, Kalamazoo, Michigan
St. John's University, Collegeville, Minnesota
Northeast Missouri State Teachers College, Kirksville, Missouri
University of Omaha, Omaha, Nebraska
Brooklyn College, Brooklyn, New York
Colgate University, Hamilton, New York
St. Lawrence University, Canton, New York
Syracuse University, Syracuse, New York
University of Buffalo, Buffalo, New York
Denison University, Granville, Ohio
Kent State University, Kent, Ohio
University of Toledo, Toledo, Ohio
Phillips University, Enid, Oklahoma
Thiel College, Greenville, Pennsylvania
West Texas State Teachers College, Canyon, Texas
Utah State Agricultural College, Logan, Utah
Concord College, Athens, West Virginia
West Virginia Wesleyan College, Buckhannon, West Virginia

VETERANS UNDER THE G.I. BILLS

In the fall of 1955, 18 per cent of the undergraduate enrollment in the six colleges were receiving financial aid under Public Law 16 (disabled veterans), Public Law 346, and Public Law 550. Four years ago, 83 per cent of the entire undergraduate enrollment were receiving aid largely under Public Law 346 (World War II). In the present freshman class, 68 students, or 13 per cent, were receiving aid under Public Law 550 (Korean Bill of Rights). It is apparent that most of the so-called Korean veterans have used up the financial aid to which they were entitled under Public Law 550 prior to their entrance to professional schools.

TABLE XIV—NUMBER OF VETERANS UNDER G.I. BILLS

College	Freshmen	Sophomores	Juniors	Seniors	Total
CCO	11	8	5	3	27
COPS	20	22	9	2	53
DMS	9	10	8	2	29
KC	23	39	41	51	154
KCOS	18	15	4	3	40
PCO	19	11	12	3	45
	100	105	79	64	348

NATIONAL OSTEOPATHIC COLLEGE SCHOLARSHIPS

The Auxiliary to the American Osteopathic Association inaugurated a scholarship program in the fall of 1949. Five osteopathic scholarships of $1,000 each are awarded each year. Information about the scholarships is mailed to the deans of approved colleges of arts and sciences throughout the United States and Canada each fall. The scholarships are applied to the college tuition at the rate of $500 per year for the first 2 years in the osteopathic colleges in which the applicants matriculate. Applications for the scholarships for the entering classes in 1956 will close May 1, 1956.

In 1955 the five scholarship winners were as follows:

Name	Preprofessional College Attended	Osteopathic College Entered
Angelos Constantinides	Wayne University Detroit, Michigan	Chicago College of Osteopathy
John DeAngelis, Jr.	Northeast Missouri State Teachers College, Kirksville, Missouri	Kirksville College of Osteopathy and Surgery
Robert T. Hite	Hillsdale College, Hillsdale, Michigan	Kirksville College of Osteopathy and Surgery
Harold C. Hunter	Carroll College, Helena, Montana	Kirksville College of Osteopathy and Surgery
Maurice W. Payne	Northeast Missouri State Teachers College, Kirksville, Missouri	Kirksville College of Osteopathy and Surgery

A scholarship applicant must have received at least a tentative acceptance from an osteopathic college in order to be eligible to make application for scholarship aid. Information about the scholarship program can be secured at the Office of Education, American Osteopathic Association, 212 East Ohio Street, Chicago 11, Illinois.

Scholarship awards will be made on the basis of quantity and quality of preprofessional work, the score on the interest inventory, personality factors, financial need, and motivation toward the osteopathic school of medicine.

ADDITIONAL SCHOLARSHIP AID

The Auxiliary to the California Osteopathic Association for several years has been awarding one scholarship a year to an applicant to the College of Osteopathic Physicians and Surgeons in Los Angeles. Information regarding this scholarship aid may be obtained by writing Mrs. Thomas J. Meyers, secretary, 525 Covington Place, Pasadena 2, California.

The Maine Osteopathic Association initiated a scholarship program in 1953 which provides $500 toward tuition during the freshman year for a student who has received his preprofessional training in an approved college or university in the state of Maine and who has been accepted for admission to any of the osteopathic colleges. Information regarding this scholarship may be obtained by writing to Dr. John M. Thurlow, Professional Building, Main Street, Waterville, Maine.

The Canadian Osteopathic Association awards two scholarships a year to young men and women in Canada who are planning to study osteopathy and to practice in any province of Canada. Information about these scholarships may be obtained by writing to Miss Joyce S. Currie, secretary, Canadian Osteopathic Association, 609 Medical Arts Building, Montreal 25, Quebec, Canada.

The staff of the Garden City Hospital, Garden City, Michigan, initiated a scholarship program in 1954, which will provide annually at least $360 to be applied toward tuition. The applicant must be a resident of the state of Michigan and must show evidence of financial need. Information about these scholarships may be obtained by writing to Dr. John T. Baker, treasurer, Garden City Hospital Scholarship Fund, 1810 North Telegraph Road, Dearborn, Mich.

Various loan funds are maintained and administered by the osteopathic colleges for junior and senior students. The American Osteopathic Association for many years has administered a large loan fund, which is available to osteopathic students in their junior and senior years upon recommendation of their respective college deans.

The Osteopathic Foundation also maintains a student loan fund for juniors and seniors in osteopathic colleges who are recommended by their faculty committees. Inquiries may be sent to the chairman of the Osteopathic Foundation Student Loan Fund Committee, 212 East Ohio Street, Chicago 11, Illinois.

EDUCATIONAL STANDARDS FOR OSTEOPATHIC COLLEGES*

1955

Approved by the Board of Trustees of the American Osteopathic Association

ADMISSION REQUIREMENTS

1. A minimum of three years of college training in a college or university accredited by a regional educational association is desirable for admission to professional education in an osteopathic college.† An applicant for admission must have completed at least one-half of the required credit for a baccalaureate degree in an accredited college to be considered for admission to an osteopathic college. In exceptional cases, a duly recognized and approved osteopathic college may request that the academic credentials of a highly qualified student, who has completed his preprofessional work in a college or university not accredited by a regional educational association, be evaluated by the Bureau of Professional Education and Colleges of the American Osteopathic Association. Approval of such credentials by the Bureau must be obtained before admission of any such exceptional student to an osteopathic college. Each such case shall be considered upon an individual basis.

All transcripts of records from other schools shall be obtained directly from such schools. Transcripts presented directly by the applicant will not be acceptable.

The official transcript of each applicant must show the satisfactory completion of the following minimum credits in basic subjects prior to admission:

English	6 semester hours (12 hours recommended)
Physics	‡6 to 8 semester hours
Biology	‡6 to 8 semester hours (12 hours recommended)
Inorganic Chemistry	8 semester hours
Organic Chemistry	4 to 8 semester hours, including both the aliphatic and benzene compounds

It is desirable that the elective subjects afford a broad educational and cultural background.

2. The American Council on Education has evaluated the content and quality of the various educational programs conducted by the Armed Forces and has issued a "Guide to the Evaluation of Educational Experiences in the Armed Forces" to assist educational institutions, desiring to do so, to award proper college credits for specific courses taken in these programs.

The following statement is accepted by the American Osteopathic Association as a basis for the evaluation of equivalency of college credits:

College credits (except in science courses requiring laboratory work or except blanket credits for military services not based on courses or examinations) may be based either on (a) courses taken from the Armed Forces Institute or in service courses of the Armed Forces according to the "Guide to the Evaluation of

*Revised and issued by the Bureau of Professional Education and Colleges of the American Osteopathic Association.

†Undergraduate college programs are accredited by the following five regional educational associations:

Middle States Association of Colleges and Secondary Schools
North Central Association of Colleges and Secondary Schools
Northwest Association of Secondary and Higher Schools
Southern Association of Colleges and Secondary Schools
Western College Association

The New England Association of Colleges and Secondary Schools is not an accrediting agency, but has standards for membership similar to those maintained by the above five accrediting agencies. Membership in the New England Association of Colleges and Secondary Schools is recognized by the American Osteopathic Association as approval of the colleges in that area.

All approved undergraduate colleges require high school graduation or its equivalent for admission.

‡Whichever is a complete year's course in the college involved.

Educational Experiences in the Armed Forces" of the American Council on Education, or (b) performance in the General Educational Development Tests of the American Council on Education.

3. In addition to the academic requirements listed in paragraphs 1 and 2, applicants to osteopathic colleges shall be selected on the basis of academic performance, osteopathic motivation and personal qualifications.

4. With the consent of the Bureau of Professional Education and Colleges, upon due individual consideration, not more than two years of time credit may be accorded to students presenting credentials from other than osteopathic professional schools. Neither time credit nor subject credit shall be accorded, unless such credit can unmistakably be interpreted as the equivalent of courses in the same subjects over the same period of time in the osteopathic college which grants the credit.

5. Credit for work done in other approved medical schools may be accorded only after most careful individual evaluation.

EDUCATIONAL STANDARDS
(Minimum Requirements)

1. *Organization.*—

An osteopathic college shall be incorporated as a non-profit institution.

The Board of Trustees shall be composed of persons, including a strong representation of laymen, interested in the advancement of the osteopathic school of practice. No member or officer of the Board shall receive financial remuneration from the operation of the college or its associated teaching hospitals. The members of the Board should serve sufficiently long terms so that continuity of the institution's program will be carried out without precipitate change in policy. Since the Board of Trustees is the responsible corporate body and is required to establish policy in the direction and guidance of the administration and the educational activities of the institution, it follows that a member of the administrative staff or faculty should not be a member or officer of the Board of Trustees.

The institution must be organized to conform to accepted standards of professional education as to business management, faculty and professional staff.

Since the proper teaching of osteopathic medicine cannot be accomplished with the revenue derived through income from students, an acceptable college must show adequate additional income.

The primary objective of the college shall be to provide an educational program which will prepare osteopathic physicians and surgeons for general practice in osteopathic medicine. Such an educational program will afford the proper foundation for any course of continuing training as may prove desirable.

Administration and faculty shall consist of persons who are (a) devoted to the primary objective of the college, (b) possessed of such qualifications and purposes as will assure the perpetuation of the osteopathic school of medicine, and (c) inspired toward the further development of distinctive osteopathic contribution to the broad field of medicine.

The evaluating agency for osteopathic teaching institutions is the American Osteopathic Association, acting through its Board of Trustees on recommendation of the Bureau of Professional Education and Colleges.

The college shall afford to proper representatives of the American Osteopathic Association unhampered opportunities to study and inspect the facilities, students, faculty and administration, including a study of all records, credentials, grading, promotion and graduation procedures.

The colleges shall fill out, annually, student personnel information blanks for the Association's records and supply lists of students by classes in order that accurate information may be recorded in the files of the Association. The college shall complete annual college survey blanks as requested by the Bureau of Professional Education and Colleges of the American Osteopathic Association.

The college shall seek membership in the American Association of Osteopathic Colleges and enter into agreement with the members of that Association and the Bureau of Professional Education and Colleges of the American Osteopathic Association as to credits to be granted and regulations to be followed in the transference of students from one osteopathic college to another.

2. *Administration.*—

The college shall be under the direction and supervision of a president, dean or other executive officer, selected because of his particular training and experience and capable of interpreting the prevailing standards for osteopathic education. This individual shall have authority to carry these standards into effect. Appointment and promotion of the administrative staff shall be made by the Board of Trustees, on the recommendation of the executive officer. Appointment and promotion of the faculty shall be made by the Board of Trustees on the recommendation of the chief executive officer, who shall transmit to the Board of Trustees the recommendations of the dean developed through consultation with the department chairmen.

The number of students for which the institution can adequately provide an educational program shall be taken into consideration in determining the necessary faculty and clinical, laboratory and hospital facilities.

A system of faculty-student advisers shall be established, and opportunity for frequent personal contact between members of the faculty and of the student body shall be provided.

Each college shall publish a catalog not less frequently than every other year. Catalogs shall list the courses available, the faculty members and the time schedule. Catalogs shall set forth the entrance requirements, tuition fees, and such general information as is necessary to the members of the student body. The list of students enrolled each year shall be included.

A committee of the faculty for the evaluation of entrance credentials shall assist the executive officer in evaluating the qualifications of applicants.

Faculty meetings shall be held at stated intervals at which time reports of the various faculty committees shall be presented to the faculty.

Records of preliminary education and certification thereof shall be kept on file permanently for examination by proper officials. The system of records must show in detail throughout the college course, the attendance record, grade and any other notations useful in evaluating the total work of each student.

Students shall be required to be in actual attendance within the first week of each term for which they receive credit. Each student shall be required to be in actual attendance in the institution during the four years required for his undergraduate work unless time credit has been accorded for work actually pursued in attendance at another osteopathic college approved by

the American Osteopathic Association or in other similarly approved colleges. Students shall complete at least the last year of their undergraduate course in residence in the college which confers the degree.

No credit shall be accorded in any course wherein the record indicates an attendance of less than 80 per cent.

Graduates must be at least 21 years of age at the time of graduation.

3. *Faculty.*—

A competent teaching faculty shall be selected and it shall be organized into departments. In addition to other qualifications, consideration should be given to thorough training, a successful teaching experience, clinical experience and demonstrated ability or desire to engage in research. In the selection of faculty members, the executive officer should consult with the department heads and transmit to the Board of Trustees recommendations developed through such conferences.

Faculty members should have a reasonable security and tenure.

The faculty roster should list at least ten full-time teachers of professional rank. In the laboratory courses there should be a minimum ratio of one assistant for each 25 students.

A qualified librarian should be employed to supervise and develop the library.

4. *Plant.*—

A college must have for its exclusive use adequate buildings, which provide lecture rooms, laboratories, library and administrative offices.

The medical library should include the modern texts, reference books, and the leading periodicals needed in the teaching program.

5. *Teaching Aids.*—

Each institution should have a museum of pathological and anatomical specimens, and such auxiliary adjuncts, including visual aids, as are desirable for effective teaching.

A sufficient number of cadavers should be provided so that every two students may dissect at least a lateral half.

A supply of animals should be provided for use in the college laboratories. Adequate provision shall be made for their care and housing.

6. *Clinical Facilities.*—

Each college shall operate a general clinic. Histories and records in the clinic shall be maintained and utilized as teaching material. Clinics should be organized so that patients may be cared for in the clinic or in their homes.

Osteopathic colleges must have access, for teaching purposes, to a general hospital or hospitals affiliated with, or under control of, the college.

The college should appoint those who direct the clinical teaching, or supervise the staff concerned with teaching in such hospitals in order that proper supervision can be exercised over students in their contact with patients.

Students should have opportunity of observing and studying a wide variety of diseases ranging from the common case problems to the complex and rare conditions. The material available should be used to its greatest teaching value. The student class should be so organized as to afford the closest possible approach to individual instruction.

Clinical clerkships should be provided. Students should observe, keep records and administer treatment under the supervision of the teaching staff.

An obstetrical clinic must be conducted so that each student shall be properly trained in the care and management of obstetrical cases. All areas of clinical participation shall be under the supervision of the responsible teaching class. A carefully prepared report and summary shall be compiled by the student for each case under his observation.

Students shall attend post-mortem examinations under the direction of the Department of Pathology. Each student shall prepare protocols on at least six post-mortem examinations.

Training Criteria for the Clinical Clerkship in the Hospital:

Clinical clerkship programs in hospitals which are not on the campus of an approved college, and not under the immediate authority of the college administration shall be approved only in hospitals having the approval of the American Osteopathic Association for either intern or residency training or both.

Facilities for clinical clerkship training under the immediate authority of the college which fall in categories other than outpatient clinics and approved hospitals shall be inspected and appraised for approval on an individual basis.

The program must provide educational experience in the various departments of the hospital.

There must be a definite program of instruction, including case recording and study, clinical observation, collateral reading, didactic work and a regular program of staff lectures, clinical conferences, etc.

There must be adequate daily supervision of the student, and his progress must be reported regularly to the college.

A properly qualified individual must be designated as in charge of the clerkships in the affiliated institution. This individual should be directly responsible to the dean of the college with which the hospital is affiliated.

The clinical faculty in the affiliated institution must be composed of qualified members properly organized as a teaching faculty.

The sufficiency and diversity of clinical material in the affiliated institutions should determine the number of students to be trained at any one time.

Such programs shall be evaluated by the Bureau of Professional Education and Colleges in the accreditation procedure for the colleges.

7. *Curriculum.*—

Since the osteopathic profession and its colleges maintain their independence and distinction in the general field of medicine because of the contribution which osteopathy makes to the prevention, the diagnosis and the treatment of disease, and because the importance of maintaining the structural integrity of the body should be recognized and emphasized in all departments of practice, approved osteopathic colleges are required to give adequate and comprehensive training in the principles and practice of osteopathic diagnosis and therapeutics. This requirement includes, first, the presentation of special courses of instruction in distinctively osteopathic subjects, particularly applied anatomy and physiology, osteopathic principles, structural pathology and osteopathic manipulative technics.

In addition to the special courses named hereafter, the course content of the basic science subjects—anatomy, physiology, chemistry, pathology, bacteriology and immunology—should include the presentation and dis-

cussion of structural pathologies, their presence, their effects, their influence on anatomical relationships, the physiological and chemical reactions of the body, the progression of pathological changes, and the natural resistance of the body to the invasion of microorganisms.

During the clinical years, the part played by structural pathologies in the etiology, pathology, diagnosis, prognosis and treatment of all classifications of diseases shall be presented and fully discussed. The incorporation of structural findings in case records and the application of osteopathic manipulative treatment, whenever indicated, shall be required in the management of every teaching case in the outpatient clinic and the teaching hospital.

The curriculum in a college of osteopathy should be presented in a minimum of four standard academic years of at least one thousand (1000) hours each and should include adequate and comprehensive instruction in:

Anatomy
Embryology
Histology
Physiology
Biochemistry
Pharmacology
Toxicology
Sanitation
Bacteriology
Parasitology
Immunology
Radiology
Comparative Therapeutics
Materia Medica—associated subjects
Pathology
Public Health—Preventive Medicine
Hygiene
Obstetrics and Gynecology
Osteopathic Medicine
Osteopathic Principles, Practice and Technic
Internal Medicine
Surgery
Orthopedic Surgery
Urology
Otorhinolaryngology
Ophthalmology
Anesthesiology
Neurology
Psychiatry
Pediatrics
Dermatology and Syphilology
Therapeutics
Tropical Medicine

8. *Degree.*—

Inasmuch as the degree of Doctor of Osteopathy is a time-honored designation, conferred by colleges of osteopathy to distinguish the graduates of the osteopathic school of practice; since it is a term legalized by charters of all osteopathic colleges and a legal term written into many laws governing the practice of osteopathic physicians and surgeons; since it is the term used in literature, reference books, governmental regulations (national, state, local, etc.) to designate graduates of this school; since it serves to distinguish such graduates from graduates of other schools of the practice of the healing arts; since it has become a well-confirmed precedent in designation of osteopathic physicians; since much labor has been expended to identify the degree with its exponents; therefore, the only degree to be issued by an approved osteopathic college qualifying candidates for examination for licensure to practice the healing arts shall be the degree, Doctor of Osteopathy.

It is not intended thereby to prevent approved osteopathic colleges from granting honorary degrees nor degrees in course of such nature as shall be warranted by courses undertaken in whole or in part in the approved college.

APPROVED OSTEOPATHIC COLLEGES

Chicago College of Osteopathy
5250 Ellis Avenue, Chicago 15, Illinois

Location: Northeastern part of Illinois on Lake Michigan, population 3,500,000, transportation center of United States.

Enrollment: Freshman capacity 70, total enrollment capacity 240.

Entrance requirements in addition to minimum requirements: Three years of preprofessional study or 90 semester hours, 6 to 8 semester hours of organic chemistry.

Length of course: 36 months, 5,467 instructional hours.

College expenses: Tuition $700 per year, includes all fees, books $125 per year, students required to purchase microscopes, cost $250 to $300.

Living costs: Minimum board $15 per week, minimum room costs $7 per week.

Living accommodations: One fraternity house with capacity of 34, private residences located conveniently to the college.

Affiliated teaching hospital facilities: Chicago Osteopathic Hospital, 100 beds, 15 bassinets; Detroit Osteopathic Hospital, Detroit, Michigan, 254 beds, 60 bassinets; Art Centre Hospital, Detroit, Michigan, 79 beds, 12 bassinets. Total 433 beds, 87 bassinets.

Administrative officers: R. N. MacBain, D.O., President of the College; Walter C. Eldrett, D.O., Dean of the College; Mrs. Blanche Maughan, A.B., Registrar.

College of Osteopathic Physicians and Surgeons
1721 Griffin Avenue, Los Angeles, California

Location: Southwestern California on the Pacific Coast, population 1,500,000.

Enrollment: Freshman capacity 96, total enrollment capacity 384.

Entrance requirements in addition to minimum requirements: Quantitative analysis 3 semester hours, psychology 3 semester hours, social science 3 semester hours, three years of preprofessional study or 90 semester hours.

Length of course: 40 months, 5,838 instructional hours.

College expenses: Tuition $700 per year, fees, first two years $40, last two years $35, books and equipment $115 freshman year, $165 sophomore and junior years, none the senior year, microscopes supplied by the college.

Living costs: Minimum board $15 per week, minimum room costs $7 per week.

Living accommodations: Private housing; out-of-state students may write to the Dean of the College for assistance. It is advisable to make necessary arrangements prior to start of college year.

Affiliated teaching hospital facilities: Los Angeles County Osteopathic Hospital of Los Angeles County General Hospital, 300 beds, 36 bassinets.

Administrative officers: W. Ballentine Henley, A.B., M.A., LL.B., M.S.P.A., LL.D., President of the College; Grace B. Bell, D.O., Acting Dean of the College; Benjamin W. Fullington, A.B., M.A., Registrar.

Des Moines Still College of Osteopathy and Surgery
720 Sixth Avenue, Des Moines, Iowa

Location: Central Iowa, the capital city, population 175,000.

Enrollment: Freshman capacity 70, total enrollment capacity 280.

Entrance requirements in addition to minimum requirements: Three years of preprofessional college or 90 semester hours.

Length of course: 40½ months, 7,017 instructional hours.

College expenses: Tuition $800 per year, including fees, books $100 to $150 per year, students required to purchase microscopes, cost $250 to $300.

Living costs: Minimum board $16 per week, minimum room costs $7.50 per week.

Living accommodations: One fraternity house with capacity of 55, ample boarding houses near college.

Affiliated teaching hospital facilities: Still Osteopathic Hospital, 97 beds, 20 bassinets; Des Moines General Hospital, 37 beds, 5 bassinets; Wilden Osteopathic Hospital, Des Moines, Iowa, 45 beds, 12 bassinets; Doctors Hospital, Columbus, Ohio, 150 beds, 20 bassinets; Flint Osteopathic Hospital, Flint, Michigan, 45 beds, 10 bassinets. Total 374 beds, 67 bassinets.

Administrative officers: Edwin F. Peters, A.B., B.S., M.A., Ph.D., President of the College; John B. Shumaker, B.A., M.S., Ph.D., Dean of the College; Wendell R. Fuller, B.S., Registrar.

Kansas City College of Osteopathy and Surgery
2105 Independence Avenue, Kansas City 1, Missouri

Location: Extreme western part of state on the border of Kansas, a center of transportation facilities, population 400,000.

Enrollment: Freshman capacity 100, total enrollment capacity 400.

Entrance requirements in addition to minimum requirements: Three years of preprofessional study.

Length of course: 38½ months, 5,648 instructional hours.

College expenses: Tuition $600 per year, fees $53 per year, books $100 per year, students required to purchase microscopes, cost $250 to $335.

Living costs: Minimum board $15 per week, minimum room costs $6 per week.

Living accommodations: Private boarding houses in the immediate vicinity of the college, "low cost" housing development close to the college provides accommodations for married students.

Affiliated teaching hospital facilities: Osteopathic Hospital Unit, 150 beds; Conley Maternity Hospital Unit, 30 beds, 30 bassinets. Total 180 beds, 30 bassinets.

Administrative officers: Joseph M. Peach, B.S., D.Sc., President of the College; Kenneth J. Davis, A.B., D.O., Dean of the College.

Kirksville College of Osteopathy and Surgery
Kirksville, Missouri

Location: North central part of the state, population 12,000.

Enrollment: Freshman capacity 100, total enrollment capacity 400.

Entrance requirements in addition to minimum requirements: Three years of college credit required; outstanding students, on individual evaluation, may be accepted with less than three years of credit, provided they have completed one-half of the credits required for a baccalaureate degree; organic chemistry 6 to 8 semester hours.

Length of course: 30 months, 5,830 instructional hours.

College expenses: Tuition $700 per year, books $100 per year, students required to purchase microscopes, cost $175 to $300.

Living costs: Minimum board $250 to $350 per year, minimum room costs $150 to $250 per year.

Living accommodations: 24 veterans' units, apartment house with seven apartments, dormitory for 26 men, four fraternity houses, private residences.

Affiliated teaching hospital facilities: Kirksville College of Osteopathy and Surgery Hospital, 108 beds, 20 bassinets; Laughlin Hospital, 92 beds, 7 bassinets; Community Nursing Home, 113 beds; Still Convalescent Home, 17 beds; Still-Hildreth Osteopathic Sanatoria, 280 beds. Total 610 beds, 27 bassinets.

Administrative officers: Morris Thompson, A.B., L.H.D., D.Sc.Os., President of the College; M. D. Warner, A.B., D.O., Dean of the College; Marie A. Johnson, Registrar.

Philadelphia College of Osteopathy
48th and Spruce Streets, Philadelphia 39, Pennsylvania

Location: Southeastern part of Pennsylvania, population 2,000,000.

Enrollment: Freshman capacity 115, total enrollment capacity 400.

Entrance requirements in addition to minimum requirements: No change.

Length of course: 37½ months, 6,132 instructional hours.

College expenses: Tuition $750 per year, including fees, books $125 per year, students required to purchase microscopes, average cost $300.

Living costs: Minimum board $17 per week, minimum room costs $8 per week.

Living accommodations: 3 fraternity houses accommodating 45 men, private boarding houses.

Affiliated teaching hospital facilities: Osteopathic Hospital of Philadelphia, 130 beds, 29 bassinets; Osteopathic Hospital—North Center, 129 beds, 23 bassinets. Total 259 beds, 52 bassinets.

Administrative officers: William E. Brandt, D.O., President of the College; Sherwood Mercer, A.B., M.A., Dean of the College; Thomas M. Rowland, Jr., B.S., Registrar.

OSTEOPATHIC COLLEGE EXPANSION

Since 1943 members of the Osteopathic profession have been contributing generously to the six osteopathic colleges in a continuous financial aid program known as the Osteopathic Progress Fund. During the past several years an attempt has been made to interest the lay public in participation in the philanthropy for osteopathic colleges and hospitals. Funds derived from these sources are not only helping in the actual operating expenses of osteopathic colleges, but they also are being earmarked for expansion of educational facilities.

Since 1948 modest expansion of osteopathic college teaching facilities has made it possible to increase the total undergraduate osteopathic college enrollment from 1,500 to approximately 1,900 students. Further plans for the expansion of teaching facilities are rapidly taking shape. The majority of these plans primarily will increase facilities for the present maximum student enrollment. In the case of two osteopathic colleges, the expansion plans will permit a slight enrollment increase.

Chicago College of Osteopathy.—Property recent-

ly acquired by the College will be ready by the fall of 1956 to house all of the classrooms, laboratories, library, administrative offices, and student union facilities. The present outpatient clinic department will, therefore, be greatly increased. These plans will make it possible for the freshman class to be increased by 10 students, thereby increasing the total undergraduate enrollment eventually to 40 more students than at the present.

College of Osteopathic Physicians and Surgeons.—In November, 1954, a referendum was passed in Los Angeles County, providing $9,200,000 for the construction of a new 500-bed teaching osteopathic hospital, which will be one of the Los Angeles County Hospital units. This will increase hospital teaching beds for the senior class in the College of Osteopathic Physicians and Surgeons and also will increase the number of internships.

Funds from the Hill-Burton Hospital Construction Act were recently acquired by the College to build an addition to the physical rehabilitation unit of the outpatient clinic, thereby greatly increasing facilities for that phase of the clinical teaching program.

The members of the California Osteopathic Association a year ago voted to increase their state dues by $200 a year, the increase to go to the College of Osteopathic Physicians and Surgeons. This will amount to an income for the College of approximately $200,000 a year. Present plans do not include an enrollment increase.

Des Moines Still College of Osteopathy and Surgery.—During the past year the teaching clinic, immediately adjacent to the College, has tripled its former facilities for outpatient care, resulting in a great expansion in that phase of the teaching program. This expansion has made it possible for the College to more than double its former library facilities. No increase in student enrollment is contemplated at present.

Kansas City College of Osteopathy and Surgery.—With the help of funds furnished by the Hill-Burton Hospital Construction Act, the new college clinic will be erected on the present property of the College, which not only will greatly increase clinical facilities but also will free the space now used for outpatient care for use as additional classrooms and laboratories. No plans exist to increase enrollment.

Kirksville College of Osteopathy and Surgery.—The rural clinic program, which was started several years ago as an educational experiment, has been highly successful. Additional rural clinics within a 25- or 30-mile radius of Kirksville were established last year and, as funds permit, additional clinics will be initiated in 1956. This program has become an important phase in the clinical program of the senior year. No increase in enrollment is contemplated at present.

Philadelphia College of Osteopathy.—The College has acquired additional property for the future construction of a building, which will house all classrooms, laboratories, the library, assembly hall, and administrative and professorial offices. It is contemplated that this structure will be ready for occupancy by the Fall of 1958. When these new facilities are available, the College plans to increase the size of the freshman class from 80 to 125, which will result in an eventual total increase in enrollment of 180 students. More space, therefore, will be provided for additional outpatient clinical facilities and additional teaching beds in the Philadelphia Osteopathic Hospital.

DATES OF NEXT FRESHMAN MATRICULATION

Chicago College of Osteopathy	Sept. 24-29, 1956
College of Osteopathic Physicians and Surgeons	Sept. 24, 1956
Des Moines Still College of Osteopathy and Surgery	Sept. 5, 1956
Kansas City College of Osteopathy and Surgery	Sept. 10, 1956
Kirksville College of Osteopathy and Surgery	Sept. 10, 1956
Philadelphia College of Osteopathy	Sept. 7, 1956

Educational Supplement
Vol. 8, No. 1, January, 1956

REGISTRY OF OSTEOPATHIC HOSPITALS

HOSPITALS APPROVED FOR TRAINING OF INTERNS

(For the Period from July 1, 1955, to June 30, 1956)

The length of American Osteopathic Association approved intern training is 12 months.

Allentown Osteopathic Hospital, Allentown, Pennsylvania
Amarillo Osteopathic Hospital, Amarillo, Texas
Art Centre Hospital, Detroit, Michigan
Bangor Osteopathic Hospital, Bangor, Maine
Bashline-Rossman Osteopathic Hospital and Clinic, Grove City, Pennsylvania
Bay View Hospital, Bay Village, Ohio
Blackwood Clinic-Hospital, Comanche, Texas
Burbank Hospital, Burbank, California
Burton Heights Osteopathic Hospital, Grand Rapids, Michigan
Cafaro Memorial Hospital, Youngstown, Ohio
Cape Osteopathic Hospital, Cape Girardeau, Missouri
Carson City Hospital, Carson City, Michigan
Charles E. Still Osteopathic Hospital, Jefferson City, Missouri
Chicago Osteopathic Hospital, Chicago, Illinois
Civic Center Hospital, Oakland, California
Clare General Hospital, Clare, Michigan
Community Hospital, Houston, Texas
Corpus Christi Osteopathic Hospital, Corpus Christi, Texas
Dallas Osteopathic Hospital, Dallas, Texas
Davenport Osteopathic Hospital, Davenport, Iowa
Des Moines General Hospital, Des Moines, Iowa
Detroit Osteopathic Hospital, Detroit, Michigan
Doctors Hospital, Columbus, Ohio
Doctors Hospital, Los Angeles, California
Donovan Osteopathic Hospital and Clinic, Raton, New Mexico
Erie Osteopathic Hospital, Erie, Pennsylvania
Farrow Hospital, Erie, Pennsylvania
Flint General Hospital, Flint, Michigan
Flint Osteopathic Hospital, Flint, Michigan
Forest Hill Hospital, Cleveland, Ohio
Fort Worth Osteopathic Hospital, Fort Worth, Texas
Garden City Hospital, Garden City, Michigan
Gleason Hospital, Larned, Kansas
Glendale Community Hospital, Glendale, California
Grand Rapids Osteopathic Hospital, Grand Rapids, Michigan
Grandview Hospital, Dayton, Ohio
Green Cross General Hospital, Cuyahoga Falls, Ohio
Hillside Hospital, San Diego, California
Hospitals of the Kansas City College of Osteopathy and Surgery
  Osteopathic Hospital, Kansas City, Missouri
  Conley Maternity Hospital, Kansas City, Missouri
Hospitals of Philadelphia College of Osteopathy
  The Hospital of Philadelphia College of Osteopathy, Philadelphia, Pennsylvania
  North Center Hospital of Philadelphia College of Osteopathy, Philadelphia, Pennsylvania
Houston Osteopathic Hospital, Houston, Texas
Kirksville Osteopathic Hospital, Kirksville, Missouri
Lakeside Hospital, Kansas City, Missouri
Lakeview Hospital, Milwaukee, Wisconsin
Lamb Memorial Hospital, Denver, Colorado
Lancaster Osteopathic Hospital, Lancaster, Pennsylvania
Laughlin Hospital and Clinic, Kirksville, Missouri
Los Angeles County Osteopathic Hospital, Los Angeles, California
Madison Street Hospital, Seattle, Washington
Magnolia-Los Cerritos Hospitals
  Magnolia Hospital, Long Beach, California
  Los Cerritos Maternity Hospital, Long Beach, California
Mahoning Valley Green Cross Hospital, Warren, Ohio
Marietta Osteopathic Hospital, Marietta, Ohio
Massachusetts Osteopathic Hospital, Boston, Massachusetts
Maywood Hospital, Maywood, California
McCormick Osteopathic Hospital and Clinic, Moberly, Missouri
McDowell General Hospital, Phoenix, Arizona
McLaughlin Osteopathic Hospital, Lansing, Michigan
Mesa Memorial Hospital, Grand Junction, Colorado
Metropolitan Hospital, Philadelphia, Pennsylvania
Monte Sano Hospital, Los Angeles, California
Mount Clemens General Hospital, Mount Clemens, Michigan
Muskegon Osteopathic Hospital, Muskegon, Michigan
Normandy Osteopathic Hospital, St. Louis, Missouri
Oklahoma Osteopathic Hospital, Tulsa, Oklahoma
Osteopathic General Hospital of Rhode Island, Edgewood, Cranston, Rhode Island
Osteopathic Hospital of Harrisburg, Harrisburg, Pennsylvania
Osteopathic Hospital of Maine, Portland, Maine
Park View Hospital, Los Angeles, California
Parkview Hospital, Toledo, Ohio
Phoenix Osteopathic Hospital, Phoenix, Arizona
Pontiac Osteopathic Hospital, Pontiac, Michigan
Portland Osteopathic Hospital, Portland, Oregon
Riverside Osteopathic Hospital, Trenton, Michigan
Riverview Osteopathic Hospital, Norristown, Pennsylvania
Rocky Mountain Osteopathic Hospital, Denver, Colorado
Saginaw Osteopathic Hospital, Saginaw, Michigan
San Gabriel Valley Hospital, San Gabriel, California
South Bend Osteopathic Hospital, South Bend, Indiana
Stevens Park Osteopathic Hospital, Dallas, Texas
Still Osteopathic Hospital, Des Moines, Iowa
Traverse City Osteopathic Hospital, Traverse City, Michigan
Waldo General Hospital, Seattle, Washington
Waterville Osteopathic Hospital, Waterville, Maine
West Side Osteopathic Hospital of York, York, Pennsylvania
Wetzel Osteopathic Hospital, Clinton, Missouri
Wilden Osteopathic Hospital, Des Moines, Iowa
Zieger Osteopathic Hospital, Detroit, Michigan

REGISTERED OSTEOPATHIC HOSPITALS

(For the Period from July 1, 1955, to June 30, 1956)

Albuquerque Osteopathic Hospital, Albuquerque, New Mexico
Altadena Community Hospital, Altadena, California
Alva Osteopathic Hospital, Alva, Oklahoma
Aransas Pass Hospital, Aransas Pass, Texas
Aspermont Hospital and Clinic, Aspermont, Texas
Audubon Osteopathic Hospital, Audubon, New Jersey
Axtell Osteopathic Hospital, Princeton, Missouri
Bay Osteopathic Hospital, Bay City, Michigan
Bellevue Hospital and Clinic, Houston, Texas
Big Sandy Clinic and Hospital, Big Sandy, Texas
Bury Osteopathic Hospital, Clayton, Missouri
Clinic Hospital, Newata, Oklahoma
Coats-Brown Clinic and Hospital, Tyler, Texas
Colorado Hospital, Canon City, Colorado
Cottage Hospital, Oildale, California
Cottage Hospital, Pomona, California
Crews Hospital and Clinic, Gonzales, Texas
Currey Clinic-Hospital, Mt. Pleasant, Texas
Delgado Green Cross Hospital, Ysleta, Texas
Denison Hospital and Clinic, Denison, Texas
Doctors Hospital, Albuquerque, New Mexico
Doctors' Hospital, Jacksonville, Florida
Donley Osteopathic Hospital, Kingman, Kansas
East Liverpool Osteopathic Hospital, East Liverpool, Ohio
Edgewater Hospital, Milwaukee, Wisconsin
Elliston Clinic and Hospital, Covington, Tennessee
Elm Street Hospital and Clinic, Denton, Texas
Elm Street Osteopathic Hospital, Battle Creek, Michigan
Elmo Oseopathic Hospital, Elmo, Missouri
Forest Glen Hospital, Canyonville, Oregon
Fremont Clinic and Hospital, Riverton, Wyoming
Glendale Emergency Hospital, Glendale, California
Granby Community Hospital, Granby, Missouri
Groom Osteopathic Hospital, Groom, Texas
Guymon Osteopathic Hospital, Guymon, Oklahoma
Hayman's Private Hospital, Doylestown, Pennsylvania
Hinton Community Hospital, Hinton, Oklahoma
Humphreys Osteopathic Hospital, Tuscumbia, Missouri
Hustisford Hospital and Clinic, Hustisford, Wisconsin
Jenkins Clinic and Hospital, Franklin, Texas
Joplin General Hospital, Joplin, Missouri
Las Olas Hospital, Fort Lauderdale, Florida
Lathrop Osteopathic Hospital, Carlsbad, New Mexico
Leopold Hospital, Garden City, Kansas
Longs Peak Osteopathic Hospital, Longmont, Colorado
Lubbock Osteopathic Hospital, Lubbock, Texas
Manning General Hospital, Manning, Iowa
Marshfield General Hospital, Marshfield, Wisconsin
Mason Clinic and Hospital, Mason, West Virginia
McLaughlin Osteopathic Hospital, Loving, New Mexico
Medford Osteopathic Hospital, Medford, Oregon
Memorial Osteopathic Hospital, Elizabeth, New Jersey
Mercy Hospital, St. Joseph, Missouri
Mineral Area Osteopathic Hospital, Farmington, Missouri
Mineral Spring Hospital, Louisiana, Missouri
Mt. Pleasant Hospital and Clinic, Mt. Pleasant, Texas
New Mexico Osteopathic Hospital, Albuquerque, New Mexico
New Valley Osteopathic Hospital, Yakima, Washington
North Jersey Osteopathic General Hospital, Dumont, New Jersey
Northeast Osteopathic Hospital, Kansas City, Missouri
Northwest General Hospital, Detroit, Michigan
Northwest Hospital, Miami, Florida
Norwood Hospital, Mineral Wells, Texas
Ontario Community Hospital, Ontario, California
Orlando Osteopathic Hospital, Orlando, Florida
Ottawa Arthritis Hospital and Diagnostic Clinic, Ottawa, Illinois
Ozark Osteopathic Hospital, Springfield, Missouri
Palmer Osteopathic Hospital, Detroit, Michigan
Park Avenue Hospital, Pomona, California
Plattner Clinic and Hospital, Grand Prairie, Texas
Point Clinic and Hospital, Point Pleasant, West Virginia
Pool Memorial Hospital, Lindsay, Oklahoma
Porter Clinic-Hospital, Lubbock, Texas
Redfield Clinic Hospital, Redfield, Iowa
Reid Hospital and Clinic, Bethany, Missouri
Riley Sanatorium, North Muskegon, Michigan
Riverside's Osteopathic Hospital, Riverside, California
Roswell Osteopathic Hospital, Roswell, New Mexico
Saco Osteopathic Hospital, Saco, Maine
San Antonio Osteopathic Hospital, San Antonio, Texas
Sandusky Hospital, Sandusky, Michigan
Sandusky Memorial Hospital, Sandusky, Ohio
Sequoia Hospital, Fresno, California
Sheridan Community Hospital, Sheridan, Michigan
Steele City Osteopathic Hospital, Steele City, Nebraska
Still-Hildreth Osteopathic Sanatorium, Macon, Missouri
Still-Hildreth Osteopathic Sanatorium, Tulsa, Oklahoma
Stratton Hospital and Clinic, Cuero, Texas
Talco Hospital and Clinic, Talco, Texas
Tigua General Hospital, El Paso, Texas
Todd Osteopathic Hospital, Osceola, Missouri
Troy Community Hospital, Troy, Pennsylvania
Tucson General Hospital, Tucson, Arizona
Washington Hospital, Culver City, California
Wellsburg Eye and Ear Hospital, Wellsburg, West Virginia
Whitaker Osteopathic Hospital, Moberly, Missouri
Willamette Osteopathic Hospital, Albany, Oregon
Willard General Hospital, Manchester, Iowa
Wolfe-Duphorne Hospital, Athens, Texas

HOSPITALS APPROVED FOR TRAINING OF RESIDENTS

(All Residencies Approved for the Period from July 1, 1955, to June 30, 1956)

The length of the American Osteopathic Association approved training program for each specialty is 3 years. Each hospital is approved for such program but requires recertification each year.

HOSPITAL	RESIDENCIES	NAME
Allentown Osteopathic Hospital Allentown, Pennsylvania	1	Roentgenology
Art Centre Hospital Detroit, Michigan	2	Anesthesiology
	1	Internal Medicine
	1	Obstetrical-Gynecological Surgery
	2	Pathology
	2	Radiology
	2	Surgery
Bangor Osteopathic Hospital Bangor, Maine	1	Roentgenology
	1	Surgery
Bay View Hospital Bay Village, Ohio	1	Diagnostic Roentgenology
Burton Heights Osteopathic Hospital Grand Rapids, Michigan	1	Diagnostic Roentgenology
	2	Surgery
Chicago Osteopathic Hospital Chicago, Illinois	1	Anesthesiology
	2	Internal Medicine
	2	Obstetrics & Gynecology
	1	Pathology
	1	Roentgenology
	1	Surgery
Des Moines General Hospital Des Moines, Iowa	1	Anesthesiology
	1	Radiology
	2	Surgery
Detroit Osteopathic Hospital Detroit, Michigan	4	Anesthesiology
	4	Internal Medicine
	5	Obstetrics
	1	Ophthalmology & Otorhinolaryngology
	3	Orthopedic Surgery
	3	Pathology
	3	Roentgenology
	6	Surgery
Doctors Hospital Columbus, Ohio	2	Anesthesiology
	2	Internal Medicine
	1	Obstetrics
	1	Ophthalmology & Otorhinolaryngology
	1	Orthopedic Surgery
	2	Roentgenology
	3	Surgery
Doctors Hospital Los Angeles, California	2	Surgery
Flint Osteopathic Hospital Flint, Michigan	1	Anesthesiology
	1	Internal Medicine
	1	Obstetrics & Gynecology
	2	Pathology
	1	Pediatrics
	1	Radiology
	1	Surgery
Garden City Hospital Garden City, Michigan	1	Anesthesiology
	1	Diagnostic Roentgenology
	1	Obstetrical-Gynecological Surgery
Grand Rapids Osteopathic Hospital Grand Rapids, Michigan	1	Roentgenology
	1	Surgery
Grandview Hospital Dayton, Ohio	1	Anesthesiology
	1	Internal Medicine
	1	Obstetrics
	1	Ophthalmology & Otorhinolaryngology
	1	Orthopedic Surgery
	1	Roentgenology
	2	Surgery
Green Cross General Hospital Cuyahoga Falls, Ohio	1	Anesthesiology
Hospitals of the Kansas City College of Osteopathy and Surgery Kansas City, Missouri	2	Anesthesiology
	3	Internal Medicine
	2	Obstetrics & Gynecology
	1	Obstetrical-Gynecological Surgery
	2	Orthopedic Surgery
	2	Pathology
	3	Roentgenology
	2	Surgery
	1	Urological Surgery
Hospitals of Philadelphia College of Osteopathy Philadelphia, Pennsylvania	2	Anesthesiology
	3	Internal Medicine
	2	Obstetrical-Gynecological Surgery
	1	Ophthalmology & Otorhinolaryngology
	1	Orthopedic Surgery
	4	Pathology
	2	Pediatrics
	2	Radiology
	4	Surgery
Kirksville Osteopathic Hospital Kirksville, Missouri	2	Anesthesiology
	1	Diagnostic Roentgenology
	1	Internal Medicine
	2	Ophthalmology & Otorhinolaryngology
	2	Pathology
	2	Surgery
Lakeside Hospital Kansas City, Missouri	1	Anesthesiology
	1	Radiology
	2	Surgery
Lakeview Hospital Milwaukee, Wisconsin	1	Internal Medicine
	1	Surgery
Lamb Memorial Hospital Denver, Colorado	1	Surgery
Lancaster Osteopathic Hospital Lancaster, Pennsylvania	1	Roentgenology
	2	Surgery
Laughlin Hospital Clinic Kirksville, Missouri	1	Surgery
Los Angeles County Osteopathic Hospital Los Angeles, California	2	Anesthesiology
	6	Internal Medicine
	2	Neurology & Neuro-Surgery
	2	Obstetrics & Gynecology
	2	Ophthalmology & Otorhinolaryngology
	2	Orthopedic Surgery
	4	Pathology
	2	Pediatrics
	4	Radiology
	3	Surgery
	2	Urological Surgery
Massachusetts Osteopathic Hospital Boston, Massachusetts	1	Surgery
Mount Clemens General Hospital Mount Clemens, Michigan	1	Anesthesiology
	1	Diagnostic Roentgenology
	1	Internal Medicine
	1	Surgery
Muskegon Osteopathic Hospital Muskegon, Michigan	1	Diagnostic Roentgenology
Normandy Osteopathic Hospital St. Louis, Missouri	1	Anesthesiology
	1	Diagnostic Roentgenology
	1	Surgery
Oklahoma Osteopathic Hospital Tulsa, Oklahoma	1	Surgery
Osteopathic Hospital of Maine Portland, Maine	1	Anesthesiology
	1	Internal Medicine
	1	Pathology
	1	Roentgenology
	1	Surgery
Park View Hospital Los Angeles, California	1	Surgery
Parkview Hospital Toledo, Ohio	1	Diagnostic Roentgenology
	1	Surgery
Riverside Osteopathic Hospital Trenton, Michigan	1	Anesthesiology
	1	Obstetrics
	1	Surgery
Riverview Osteopathic Hospital Norristown, Pennsylvania	1	Roentgenology
	1	Surgery
Rocky Mountain Osteopathic Hospital Denver, Colorado	1	Radiology
	1	Surgery
Saginaw Osteopathic Hospital Saginaw, Michigan	1	Anesthesiology
	1	Roentgenology
	1	Surgery
South Bend Osteopathic Hospital South Bend, Indiana	1	Diagnostic Roentgenology
Stevens Park Osteopathic Hospital Dallas, Texas	1	Surgery
Still-Hildreth Osteopathic Sanatorium Macon, Missouri	3	Psychiatry
Still Osteopathic Hospital Des Moines, Iowa	1	Anesthesiology
	1	Diagnostic Roentgenology
	2	Internal Medicine
	1	Obstetrics & Gynecology
	1	Pathology
	1	Pediatrics
	2	Surgery
West Side Osteopathic Hospital of York York, Pennsylvania	1	Radiology
	1	Surgery
Wilden Osteopathic Hospital Des Moines, Iowa	1	Diagnostic Roentgenology
	1	Internal Medicine
Zieger Osteopathic Hospital Detroit, Michigan	1	Anesthesiology
	1	Obstetrics & Gynecology
	2	Roentgenology
	1	Surgery

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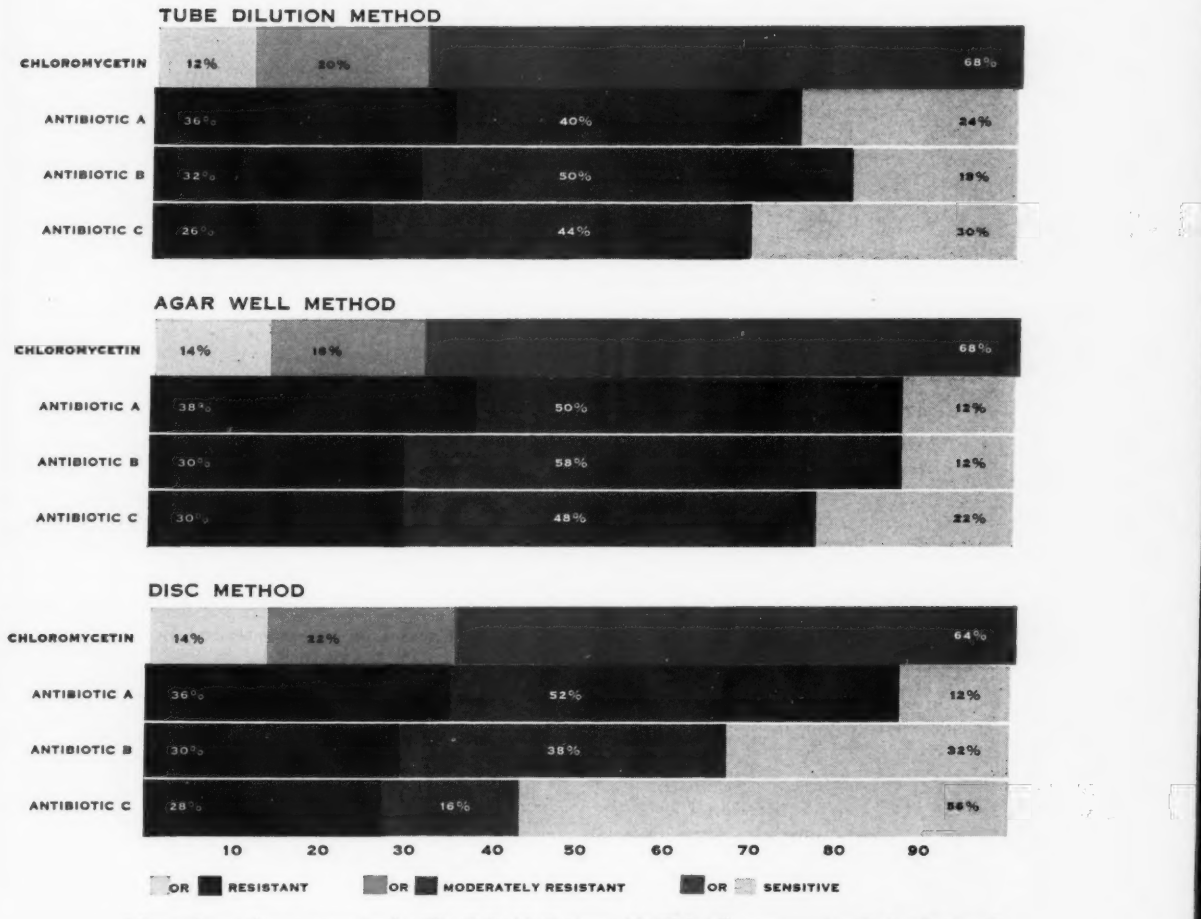

*Breakdown of gram-negative bacilli—Coli: 11; Proteus: 10; *Klebsiella pneumoniae:* 9; Aerobacter: 7; Pseudomonas: 7; Achromobacter: 2; Paracolon: 2; *Salmonella typhosa:* 1; *Bacterium anitratum:* 1. Adapted from Branch, A.; Starkey, D. H.; Rodgers, K. C., & Power, E. E.: Antibiotics Annual, 1954-1955, New York, Medical Encyclopedia, Inc., 1955, p. 1125.

CHLOROMYCETIN is a potent therapeutic agent and, because certain blood dyscrasias have been associated with its administration, it should not be used indiscriminately or for minor infections. Furthermore, as with certain other drugs, adequate blood studies should be made when the patient requires prolonged or intermittent therapy.

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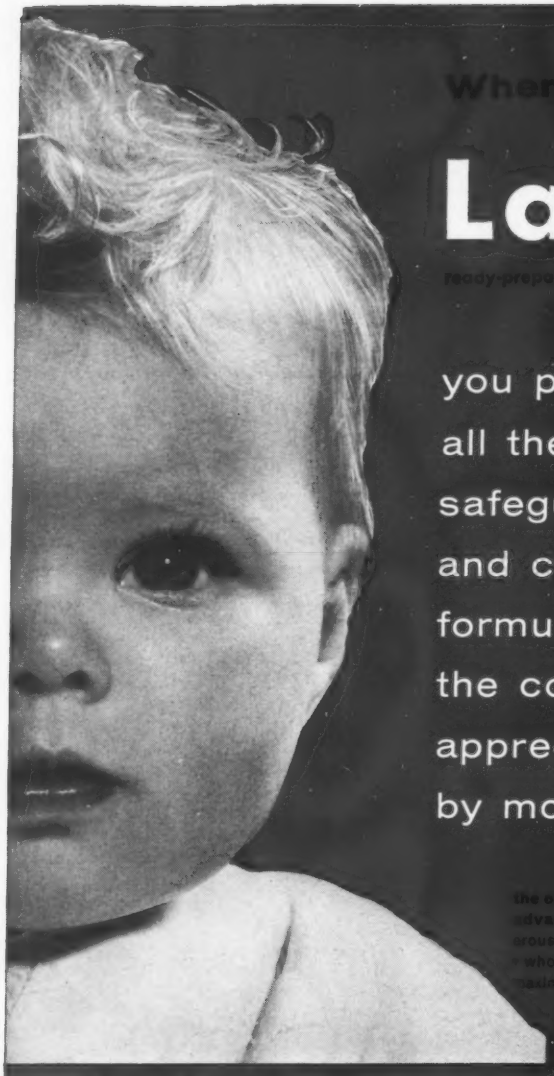

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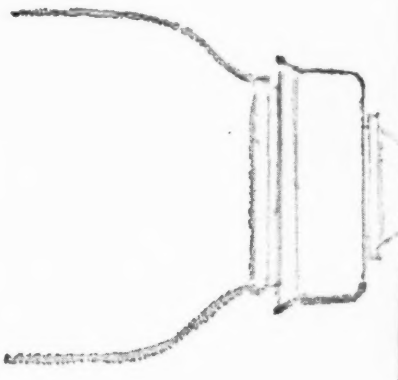

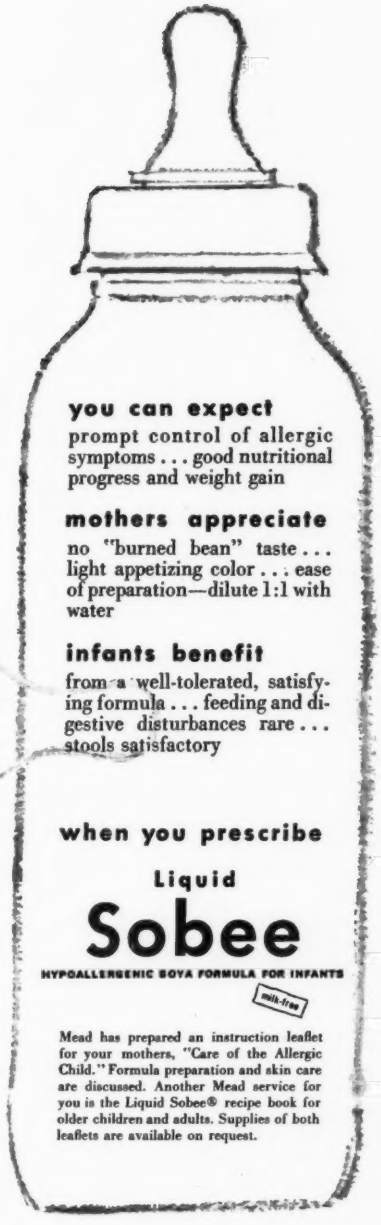

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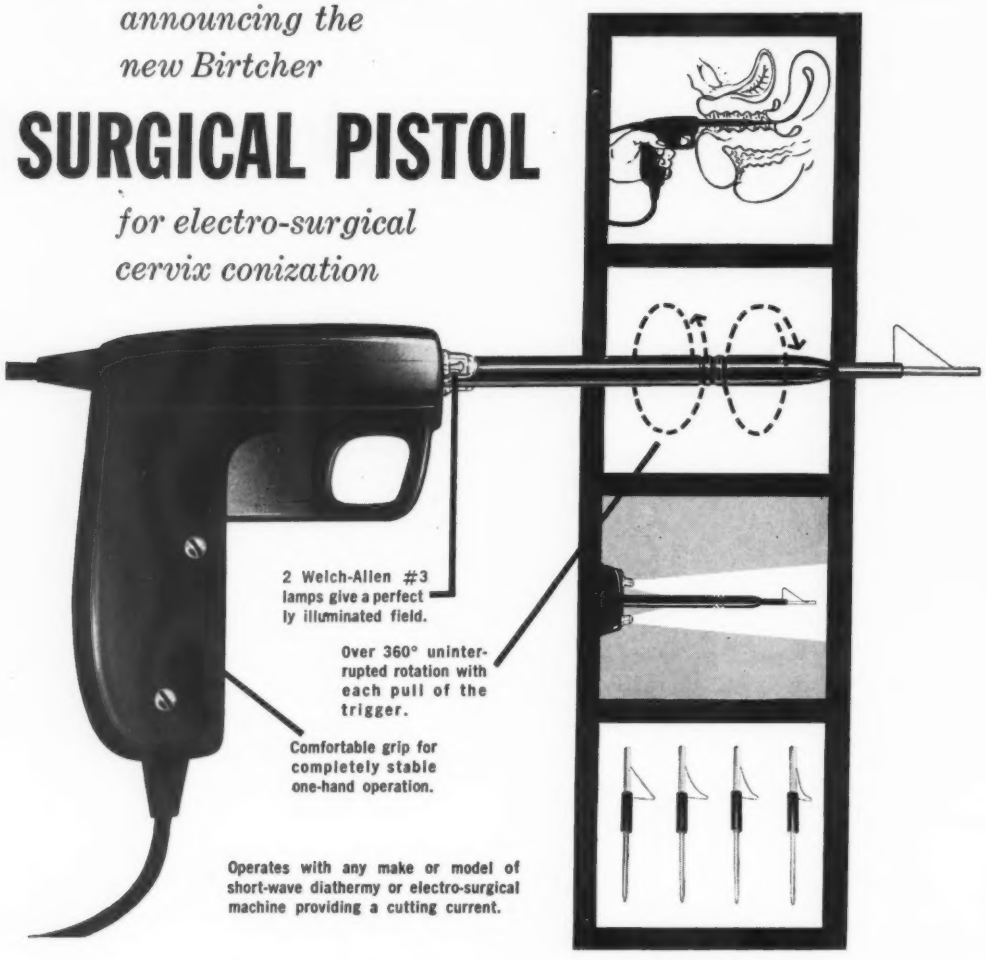
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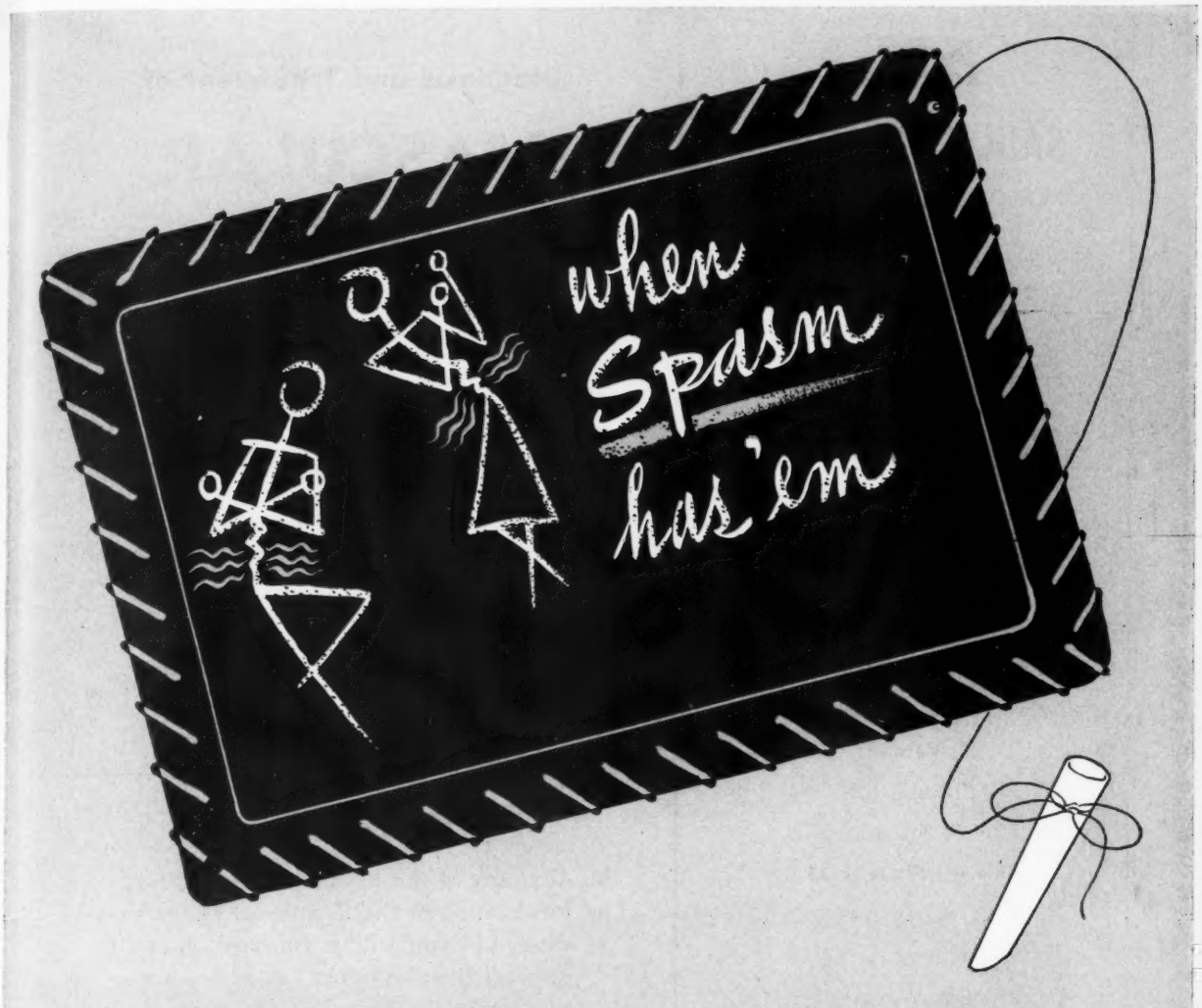

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*Steigmann, F., and Goldberg, E.: Ambulatory Continuous Drip Method in the Treatment of Peptic Ulcer, Am. J. Digest. Dis. 22:67 (Mar.) 1955.

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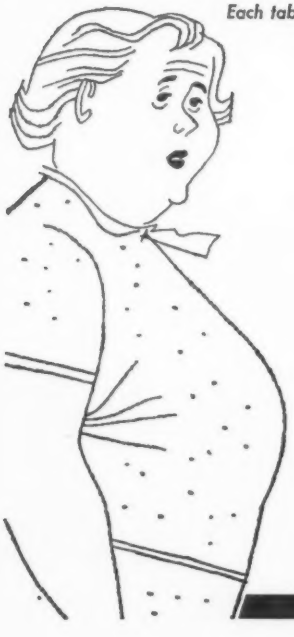

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History

The first investigation of a hemostat with an action comparable to Adrenosem Salicylate was made by Derouaux and Roskam[1] in 1937. They reported that an oxidation product of adrenalin, adrenochrome (which has no sympathomimetic properties), has prompt hemostatic activity.

It was further found that various combinations of adrenochrome, notably the oxime and semicarbazone, produced stable solutions. But, these were so slightly soluble that sufficient concentration could not be obtained for practical therapeutic use. By combining these adrenochrome compounds in a sodium salicylate complex a stable, soluble form can be obtained. This complex has been given the generic name, carbazochrome salicylate, and is supplied under the trade name Adrenosem Salicylate.

Roskam, in his study entitled "The Arrest of Bleeding,"[2] enumerates "the drugs whose efficaciousness as hemostatics have been proved by accurate methods in experimental animals and in healthy men as well. . . . One is the monosemicarbazone of adrenochrome [Adrenosem Salicylate]."

Chemistry

Adrenosem Salicylate is a synthetic chemical. The full chemical name is adrenochrome monosemicarbazone sodium salicylate complex.

Pharmacology

Although it is chemically related to epinephrine, Adrenosem Salicylate has no sympathomimetic effects. It does not alter blood components, nor does it affect blood pressure or cardiac rate.[2-7]

(* U.S. Patent 2,581,850)

Sherber, in an early study,[3] concludes that Adrenosem Salicylate* "is a potent antihemorrhagic factor in those conditions in which the integrity of the smaller vessels is interrupted, and is superior to any similar material that is now available."

He continues, "From our experience it appears that adrenochromazone complex is indicated in preventing vascular accidents incident to hypertension; in maintaining small vessel integrity; in the preoperative preparation where oozing from a vascular bed is anticipated, as in tonsillectomies, adenoidectomies and prostatectomies; and as an adjunct in the treatment of bleeding from such surgical procedures."

Adrenosem Salicylate may be administered simultaneously (but separately) with any type of anesthetic, anticoagulant, or vitamin K and heparin.

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Clinical investigators[2-7] are in agreement that Adrenosem Salicylate controls bleeding and oozing by decreasing capillary permeability and by promoting the retraction of severed capillary ends. It aids in maintaining normal capillary integrity by direct action on the intercellular "cement" in capillary walls. The interesting work of Fulton[8] confirms this. Adrenosem Salicylate, since it is not a vasoconstrictor, has no effect on large severed blood vessels and arterioles.

Adrenosem Salicylate is being used both prophylactically and therapeutically in thousands of hospitals, and in virtually every type of surgical procedure. It has also proved most useful in dental surgery.[7]

Owings reported on the use of Adrenosem Salicylate in controlling postoperative adenoid bleeding in 102 cases.[4] "We have used 2½ mg.

(½ ampule) intramuscularly, 15 minutes before anesthesia for children and 5 mg. (1 ampule) for adults." In only one patient did bleeding occur. Three others showed red blood from the nose and mouth. These patients "were then given 5 mg. intramuscularly, with prompt and complete control. We have also noticed that bleeding stopped more promptly on the operating table."

This is a 1% incidence of postoperative bleeding using Adrenosem Salicylate preoperatively, compared to an incidence of 10% postoperative bleeding in all cases taken from previous records, without Adrenosem Salicylate medication.

Peele reports on the use of Adrenosem Salicylate in treating 178 patients with 24 different conditions.[5] The drug was first used to control postoperative hemorrhage from the adenoid region. He adds: "The results were so dramatic that since that date [1953] Adrenosem Salicylate has been used postoperatively to reduce bleeding from all otolaryngologic and bronchoesophagolic procedures, to treat postoperative hemorrhage from the tonsil and adenoid regions, and to treat selected cases of epistaxis."

The effectiveness of Adrenosem Salicylate in controlling bleeding and oozing in 330 patients is reviewed by Bacala.[6] "Our experience of the effect of carbazochrome salicylate on 317 surgical indications and 13 obstetricogynecological conditions, has been therapeutically encouraging and successful for the control of capillary bleeding. Foremost among the cases studied were 223 tonsillectomies definitely benefited by this metabolic hemostat, making a diminution of the control incidence of post-tonsillectomy bleeding of 19.8% down to 7%. It has also been found useful in gastro-intestinal bleeding, cataract extraction, epistaxis, incisional seepage, trans-urethral prostatectomy, menometrorrhagias, cervical ooze, antepartum and postpartum bleeding, threatened abortion, and prevention of capillary hemorrhages during hedulin or dicumerol therapy."

Side Effects

All investigators concur that, at recommended dosage levels, Adrenosem Salicylate is free from toxic effects. No cumulative effects attributable to the drug have been reported.

The only side reaction noted has been a transient stinging sensation in the area of injection when Adrenosem Salicylate is used intramuscularly. As one investigator comments: "The brief discomfort which attends the injection of Adrenosem into the gluteal region has not been a significant problem in children or adults as originally anticipated."[5]

Indications

Idiopathic purpura, retinal hemorrhage, familial telangiectasia, epistaxis, hemoptysis, hematuria.

Postoperative bleeding associated with:
tonsillectomy, adenoidectomy and
nasopharynx surgery;
prostatic and bladder surgery;
uterine bleeding;
postpartum hemorrhage;
dental surgery;
chest surgery and chronic pulmonary bleeding.

Dosage

For recommended dosage schedules, please send for detailed literature.

Supplied

Ampuls: 5 mg., 1 cc. (package of 5).
Tablets: 1 mg. S.C. Orange, bottles of 50.
Tablets: 2.5 mg. S.C. Yellow, bottles of 50.
Syrup: 2.5 mg. per 5 cc. (1 tsp.), 4 ounce bottles.

References

1. Roskam, J. and Derouaux, G.: Arch. of Intern. Pharmacodynamie **71**:389 (1945).
2. Roskam, J.: Arrest of Bleeding, Charles C. Thomas, Springfield, Ill. 1954.
3. Sherber, Daniel A.: The Control of Bleeding, Am. J. Surg. **86**:331 (1953).
4. Owings, Capers B.: The Control of Postoperative Bleeding with Adrenosem, Laryngoscope, **55**:21 (Jan., 1955).
5. Peele, J.C.: Adrenosem in the Control of Hemorrhage from the Nose and Throat, A.M.A. Arch. of Otolaryng. **61**:450 (April, 1955).
6. Bacala, J.C.: The Use of the Metabolic Hemostat, Adrenosem Salicylate. To be published.
7. Riddle, A.C. Jr.: Adrenosem Salicylate: A Systemic Hemostat, Oral Surg., Oral Med., Oral Path. **6**:617 (June, 1955).
8. Fulton, M.D., Dept. of Biology, Boston University: Personal Communication.

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NEW!

Diseases of the Liver

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NOTE THESE CHAPTER HEADINGS and Their Authors

1. Anatomic Considerations . . . Aron M. Rappaport
2. Physiology of the Liver . . . Jesse L. Bollman
3. Biochemical Considerations . . . David Seligson
4. Experimental Hepatic Injury . . . W. Stanley Hartroft
5. Liver Function Tests . . . N. F. Maclagan
6. Needle Biopsy of the Liver . . . Leon Schiff and Edward A. Gall
7. Jaundice . . . Leon Schiff
8. Portal Hypertension . . . Robert R. Linton
9. Hepatic Coma . . . Charles S. Davidson
10. Pathology of Hepatitis . . . Hans Smetana
11. Viral Hepatitis . . . John R. Neefe
12. Toxic Hepatitis . . . Gerald Klatskin
13. Hepatitis Associated with Systemic Infections . . . Gerald Klatskin
14. Portal Cirrhosis (Laennec's Cirrhosis) . . . Arthur J. Patek, Jr.
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16. Biliary Cirrhosis . . . Henry G. Kunkel
17. Hemochromatosis . . . Theodore L. Althausen and Victor M. Sborov
18. Hepato-lenticular Degeneration . . . W. B. Matthews
19. Liver in Circulatory Failure . . . Sheila Sherlock
20. Syphilis of the Liver . . . Franklin M. Hanger
21. Tumors of the Liver . . . Edward A. Gall
22. Hepatic Abscess . . . Michael M. De Bakey and Oscar Creech, Jr.
23. Liver Diseases in Infancy and Childhood . . . Wolf W. Zuelzer
24. Parasitic Diseases of the Liver . . . Enrique Koppisch
25. Amyloidosis . . . Maurice H. Stauffer and David C. Dahlin
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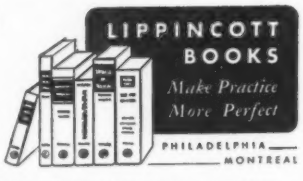

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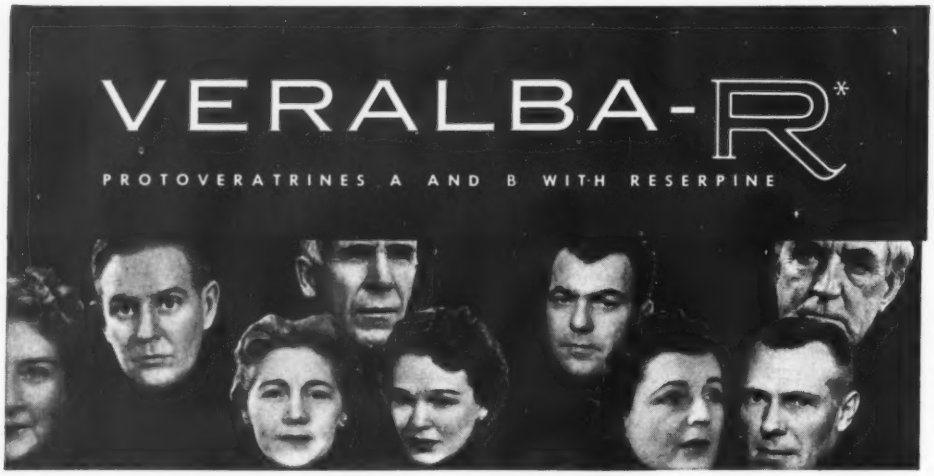

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Conventions and Meetings

Announcements

American Osteopathic Association, Sixtieth Annual Convention, Hotel Statler, New York City, July 16-20, 1956. Program Chairman, Myron C. Beal, 17 Vick Park A., Rochester 7, N. Y.

Academy of Applied Osteopathy, annual meeting, Hotel Waldorf, New York City, July 20. Secretary, Margaret W. Barnes, Box 1345, Carmel, Calif.

American College of Osteopathic Obstetricians and Gynecologists, annual meeting, Neil House Hotel, Columbus, Ohio, February 6-9. Program Chairman, Richard E. Eby, 1247 N. Park Ave., Pomona, Calif. Secretary, Harold K. Morgan, 3268 W. 32nd Ave., Denver 11.

American College of Osteopathic Surgeons, annual meeting, Hotel Statler, Detroit, October 28-November 1. Secretary, Orel F. Martin, Box 474, Coral Gables 34, Fla.

American Osteopathic Academy of Orthopedics, annual meeting, Hotel Statler, Detroit, October 28-November 1. Secretary, J. Paul Leonard, 2673 W. Grand Blvd., Detroit 8.

American Osteopathic College of Anesthesiologists, annual meeting, Hotel Statler, Detroit, October 28-November 1. Secretary, Crawford M. Esterline, Box 155, Kirksville, Mo.

American Osteopathic College of Proctology, annual meeting, Hotel Statler, Dallas, Tex., March 27. Secretary, John W. Orman, 1623 E. 15th St., Tulsa 14, Okla.

American Osteopathic College of Radiology, annual meeting, Hotel Statler, Detroit, October 28-November 1. Secretary, F. A. Turfler, Jr., South Bend Osteopathic Hospital, 118 S. William St., South Bend 2, Ind.

American Osteopathic Hospital Association, annual meeting, Hotel Statler, Detroit, October 28-November 1. Secretary, Mrs. Byron Axtell, Princeton, Mo.

American Osteopathic Society of Proctology, annual meeting, Hotel Statler, Dallas, Tex., March 28-30. Program Chairman, E. R. Horton, Jr., 214 E. DeWald St., Fort Wayne 5, Ind. Secretary, Carl S. Stillman, Jr., 3523 Fifth Ave., San Diego 3, Calif.

British Columbia: See Northwest Osteopathic Convention.

California, annual meeting, Mission Inn, Riverside, May 24-27. Program Chairman, Milton Futterman, 2028 E. First St., Los Angeles 22. Executive Secretary, Mr. Thomas C. Schumacher, 1298 Wilshire Blvd., Los Angeles.

Colorado, annual meeting, Denver, May 5. Program Chairman, A. E. Nichols, 1332 Del Mar Parkway, Denver 8. Secretary, C. Robert Starks, 1459 Ogden St., Denver 18.

Connecticut, midyear meeting, February 18-19. Program Chairman, E. R. Lamb, 44 Whitney St., Hartford 5. Secretary, C. W. Cornbrooks, 182 Post Road, Darien.

Eastern Osteopathic Association, annual meeting, Hotel Statler, New York City, March 24-25. Program Chairman, Chester L. Losee, 212 Prospect St., Westfield, N. J. Secretary, Frank B. Tompkins, Baltimore Life Bldg., Baltimore 1.

Florida, annual meeting, Fort Harrison Hotel, Clearwater, May 17-19. Program Chairman, Paul E. Wilson, 802 E. Ocklawaha Ave., Ocala. Secretary, Dominic Raffa, 5009 Central Ave., Tampa 3.

Georgia, annual meeting, General Oglethorpe Hotel, Savannah, April 26-28. Program Chairman, Wade Holloway, 509 Upchurch Bldg., Thomasville. Secretary, Walter B. Elliott, Jr., 702 Mortgage Guarantee Bldg., Atlanta 3.

Idaho: See Northwest Osteopathic Convention.

Indiana, annual meeting, Notre Dame University and Morris Inn, South Bend, May 14-16. Program Chairman,

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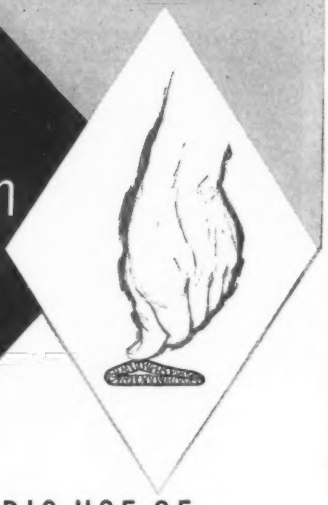

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A. F. Kull, South Bend Osteopathic Hospital, 118 S. William St., South Bend 2. Secretary, Arabelle Baker Wolf, 809-13 Odd Fellows Bldg., Indianapolis 4.

Iowa, annual meeting, Hotel Savery, Des Moines, May 20-22. Program Chairman, Clive R. Ayers, Grant. Secretary, Mr. Herman A. Walter, 200 Walnut Bldg., Des Moines 9.

Maine, annual meeting, Samoset Hotel, Rockland, June 14-16. Professional Education Chairman, Richard Wallace, Hollis Center. Secretary, Roswell P. Bates, 72 Main St., Orono.

Massachusetts, annual meeting, Hotel Somerset, Boston, January 21-22. Program Chairman, Raymond O. Johnson, 196 Main St., Brockton 1. Executive Secretary, Mrs. Gladys M. Stockdale, 524 California St., Newtonville.

Minnesota, annual meeting, Minneapolis, May 3-5. Program Chairman, Constance Idtse, 47 S. Ninth St., Minneapolis 2. Secretary, E. R. Komarek, 301 Granite Exchange Bldg., St. Cloud.

National Osteopathic Child's Health Conference and Clinic, Municipal Auditorium, Kansas City, Mo., April 9-11. Program Chairman, Robert R. Tonkens, 5910 Prospect Ave., Kansas City, Mo. Secretary, Luther W. Swift, 2105 Independence Ave., Kansas City 24, Mo.

New Jersey, annual meeting, Essex House, Newark, March 10-11. Program Cochairmen, George W. Northup, 104 S. Livingston Ave., Livingston, and Harry A. Sweeney, 25 S. Illinois Ave., Atlantic City. Executive Secretary, Mr. I. J. Tecker, 21 Hancock St., Riverside.

New York, annual meeting, Hotel Utica, Utica, October 12-13. Acting Secretary, Hewett W. Strever, 225 Titus Ave., Rochester 17.

Northwest Osteopathic Convention, Chinook Hotel, Yakima, Washington, June 25-27. Program Chairman, Wilbert B. Saunders, 4730 University Way, Seattle 5.

Ohio, annual meeting, Neil House, Columbus, May 7-9. Program Chairman, George O. Hoover, 91 S. Main St., Oberlin. Executive Secretary, Mr. William S. Konold, 50 E. Broad St., Columbus 15.

Ontario, annual meeting, Royal Hotel, Guelph, May 3-5. Secretary, A. V. DeJardine, 205 Yonge St., Toronto 1.

Oregon: See Northwest Osteopathic Convention.

Rhode Island, annual meeting, Warwick Country Club, Warwick, March 7-8. Program Chairman, Richard Dowling, 1039 Broad St., Providence 5. Secretary, J. Weston Abar, 824 Broad St., Providence 7.

Texas, annual meeting, Baker Hotel, Dallas, April 22-28. Program Chairman, Robert J. Brune, 1819 S. Brownlee, Corpus Christi. Executive Secretary, Phil R. Russell, 512 Bailey St., Fort Worth 7.

Utah, annual meeting, Ambassador Athletic Club, Salt Lake City, June 23. Program Chairman, Wilford G. Hale, 506 West 2nd South, Logan. Secretary, Alice E. Houghton, 600 Zion's Savings Bank Bldg., Salt Lake City 11.

Virginia, annual meeting, The Lodge, Williamsburg, May 25-26. Program Chairman, Vincent H. Ober, 407-11 Bankers Trust Bldg., Norfolk 10. Secretary, John A. Cifala, 2778 N. Washington Blvd., Arlington.

Washington: See Northwest Osteopathic Convention.

West Virginia, annual meeting, Daniel Boone Hotel, Charleston, June 2-5. Program Chairman, Walter B. Goff, 429 16th Street, Dunbar. Secretary, Guy E. Morris, 542 Empire Bank Bldg., Clarksburg.

Western States Osteopathic Society of Proctology, annual meeting, Mayo Hotel, Tulsa, Okla., October 8-10. Program Chairman, Glenn Miller, 2100 N. Robinson St., Oklahoma City 3. Secretary, Earle F. Waters, 925 E. South Temple St., Salt Lake City 2.

Wisconsin, annual meeting, Hotel Wisconsin, Milwaukee, April 23-25. Program Chairman, R. D. Walling, 709 Oak St., Baraboo. Secretary, Edwin J. Elton, 1518 N. 70th St., Wauwatosa 13.

State and National Boards

ARIZONA

Those interested in professional examinations should contact Russell Peterson, D.O., secretary, Osteopathic Board of Registration and Examination in Medicine and Surgery, 2747 East McDowell Road, Phoenix.

Basic science examinations March 20 at the University of Arizona, Tucson. Applications must be filed 2 weeks prior to the examination. Address Herbert D. Rhodes, Ph.D., secretary, Basic Science Board, University of Arizona, Tucson.

COLORADO

Basic science examinations March 7-8 at the Y.M.C.A. Bldg., E. 16th Ave. and Lincoln St., Denver. Applications must be filed by February 22. Address Esther B. Starks, D.O., secretary, Basic Science Board, 1459 Ogden St., Denver 18.

CONNECTICUT

Professional examinations March 13-14. Applications must be filed 2 weeks prior to examination. Address Frank Poglitsch, D.O., secretary, Osteopathic Examining Board, 300 Main St., New Britain.

Basic science examinations February 11 in Room 23, Lampson Hall, Yale University, New Haven. Applications must be filed 2 weeks prior to examination. Address Miss M. G. Reynolds, executive assistant, Board of Healing Arts, 52 Whitney Ave., New Haven 10.

HAWAII

Examination dates by Territorial Law are usually the first Wednesday, Thursday, and Friday of January, April, July, and October. One of these dates is set for examination after approval of candidate's application by the Board. Address Frank O. Gladding, D.O., secretary, Board of Osteopathic Examiners, 504 Kauikeolani Bldg., Honolulu 13.

ILLINOIS

Examinations January 24-26 in Chicago. Address Mr. Frederic B. Selcke, Superintendent of Registration, Department of Registration and Education, State House, Springfield.

IOWA

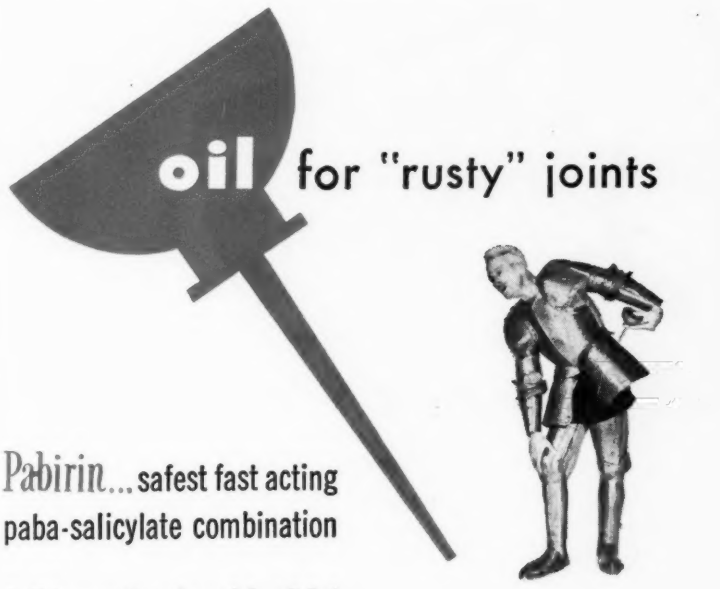
Basic science examinations April 10 at the Capitol Bldg., Des Moines. Address Ben H. Peterson, Ph.D., secretary, Board of Basic Science Examiners, Coe College, Cedar Rapids.

KANSAS

Examinations February 16-18 at Topeka. Address Forrest H. Kendall, D.O., secretary, Board of Osteopathic Examination and Registration, 420½ Pennsylvania Ave., Holton.

MICHIGAN

Basic science examinations February 10-11 at Detroit and Ann Arbor. Applications must be filed prior to February 1. Address Mrs. Anne Baker, secretary, Board of Examiners in the Basic Sciences, 116 Mason Bldg., Lansing.



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MONTANA

Examinations March 6. Address Asa Willard, D.O., secretary, Board of Osteopathic Examiners, Wilma Bldg., Missoula.

NEVADA

Professional examinations January 27 at 210 W. Second St., Reno. Applications must be filed by January 13. Address Walter J. Walker, D.O., secretary, Board of Osteopathic Examiners, 210 W. Second St., Reno.

Basic science examinations April 3. Address Donald G. Cooney, Ph.D., secretary, Board of Examiners in the Basic Sciences, Box 9005, University Station, Reno.

NEW HAMPSHIRE

Examinations March 14-15 at Concord. Address John S. Wheeler, M.D., secretary, Board of Registration in Medicine, State House, Concord.

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RHODE ISLAND

Professional examinations April 5-6. Address Mr. Thomas B. Casey, Administrator of Professional Regulation, 366 State Office Bldg., Providence.

Basic science examinations February 15-16 in Room 366, State Office Bldg., Providence. Applications must be filed by January 26. Address Mr. Casey.

SOUTH DAKOTA

Professional examinations January 17-18 at Sioux Falls. Address Mr. John C. Foster, executive secretary, Board of Medical and Osteopathic Examiners, Room 300, First National Bank Bldg., Sioux Falls.

TENNESSEE

Examinations February 8 at Nashville. Applications must be filed by January 15. Address M. E. Coy, D.O., secretary, Board of Examination and Registration for Osteopathic Physicians, 1226 Highland, Jackson.

VERMONT

Examinations January 25-26 at the State House, Montpelier. Applications must be filed by January 15. Address Charles D. Beale, D.O., secretary, Board of Osteopathic Examination and Registration, Mead Bldg., Rutland.

WISCONSIN

Basic science examinations April 7 at the Assembly Chamber, State Capitol, Madison. Applications must be filed by March 30. Address Mr. William H. Barber, secretary, Board of Examiners in the Basic Sciences, 621 Ransom St., Ripon.

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Examinations February 6 at Cheyenne. Address Franklin D. Yoder, M.D., secretary, Board of Medical Examiners, New State Office Bldg., Cheyenne.

EXAMINATION BY NATIONAL BOARD

The National Board of Examiners for Osteopathic Physicians and Surgeons conducts Parts I and II of its examination on the first Thursday and Friday of each May and December at the six approved colleges. Application blanks may be obtained from the secretary or the dean of the college, and the completed application blank, together with a passport photograph and check for the parts to be taken, must be in the secretary's office by the November 1 or April 1 preceding the examination.

Examinations in Part 1 consist of anatomy, including histology and embryology; physiology; physiological chemistry; general pathology; and bacteriology, including parasitology and immunology.

Part II consists of examinations in surgery, including applied anatomy, surgical pathology, and surgical specialties; obstetrics and gynecology; pediatrics; neurology and psychiatry; public health, including hygiene, medical jurisprudence; osteopathic principles, therapeutics, including pharmacology and materia medica.

Part III is an oral and practical examination given under the supervision of a chief examiner who is a member of the Board and by a panel of associate examiners. Subjects covered in Part III are anatomy; physiology; pathology; osteopathic principles; therapeutics, and pharmacology; surgery; ophthalmology and otorhinolaryngology; obstetrics and gynecology; physical and clinical diagnosis; public health and communicable diseases.

Part III examinations will be given at Philadelphia, March 3-4, at Kirksville, Mo., March 10-11, and at Los Angeles, March 24-25. Applications must have been filed by January 1.

These are oral examinations which the candidate may take after having satisfactorily completed the first 6 months of a 1-year internship in a hospital approved by the American Osteopathic Association for intern training. Part III is given annually at the above-named colleges.

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Application must be filed with the secretary of the Board not less than 30 days prior to the examination dates. Address Paul van B. Allen, D.O., secretary, 1512 N. Delaware Street, Indianapolis 2, Indiana.

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During January—Wisconsin, $3.00. Address Thomas W. Tormey, Jr., M.D., secretary, Board of Medical Examiners, State Office Bldg., 1 W. Wilson St., Madison.

January 31—British Columbia, amount of fee set at Annual Meeting of Council of College of Physicians and Surgeons of British Columbia. Address Lynn Gunn, M.D., Registrar, College of Physicians and Surgeons of British Columbia, 1807 W. 10th Ave., Vancouver 9.

Before February 1—Vermont, $3.00 for residents, $2.00 for nonresidents. Address Charles D. Beale, D.O., secretary, Board of Osteopathic Examination and Registration, Mead Bldg., Rutland.

Before March 1—Colorado, $2.00 if legal resident of Colorado; $10.00 if not legal resident of Colorado. Address Mrs. Beulah H. Hudgens, executive secretary, Board of Medical Examiners, 831 Republic Bldg., Denver 2.

April 1—Montana, $2.00 for those in active practice; $1.00 for those inactive. Address Asa Willard, D.O., secretary, Board of Osteopathic Examiners, Wilma Bldg., Missoula.

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CONTRIBUTIONS BY MEDICAL UNDERGRADUATES TO THE SCIENCE OF PREVENTIVE MEDICINE*

By William C. Gibson, M.D., D.Phil.†

"History is simply the biography of the mind of man; and our interest in history, and its educational value to us, is directly proportionate to the completeness of our study of the individuals through whom this mind has been manifested."
—Osler

The average student today is likely to greet with a mixture of amusement and pity any suggestion by his teachers that he might make a lasting contribution to medical science. Students have wallowed through mountainous academic seas for so long in convoy fashion—the speed of the fleet being set by the speed of the slowest ship—that their imagination has been blunted, if not embalmed. It is in the hope of resurrecting some of the keenness of students' first bright days in medical school that the following essay on student contributors of the past is presented. The inquiring, restless mind of the uninhibited undergraduate is still our greatest asset in medicine and the greatest deterrent to smugness in research.

Educators and administrators also would do well to review in retrospect the lives of past contributors in the field of preventive medicine, for in such a study there may be found the key to further

*Reprinted from *Public Health Reports*, October, 1955.

†Dr. Gibson is Kinsmen professor of neurological research at the University of British Columbia, Vancouver, Canada.

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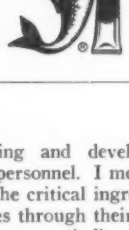

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recruiting and development of exceptional personnel. I mention educators because the critical ingredient—gray matter—passes through their hands. Their attitude, as we shall see throughout this paper, can be absolutely determinative. They can foster discovery, or they can impede it. I mention administrators, for they face a dilemma—they have to make existing methods work while insuring that they are not brushing aside as a "nonconformist" some potential discoverer.

SMALLPOX

Appropriately, this review is opened with a reference to Edward Jenner, who combined early vision, fortitude in the face of powerful critics, and a life-long delight in clinical investigation. Jenner found himself, in 1768 at the age of 19, a quaking medical apprentice noting down a patient's history, possibly one of his first. The patient was a milkmaid who, on being questioned about any possible smallpox in her history, replied, "I cannot take that disease for I have had the cowpox." Thus, the fledgling Jenner encountered early in his career the common belief among the country people of Gloucestershire that there was a harmless preventive of smallpox. Perhaps his newness to the study of medicine caused him to listen long enough to this patient's replies to gain something of value. His countryman William Withering was to stumble on the virtues of digitalis in a similar rural setting in Shropshire.

Jenner became, as have many since, a student unpopular with his teachers, for he kept bringing up his fantastic theory, as from the back pasture. However, he lived in John Hunter's house while studying in London, and his patron greatly encouraged the thoughtful undergraduate. Hunter's philosophy was couched in his immortal advice to Jenner, "But why think, why not try the experiment."

Jenner graduated at the age of 22, and, despite an offer to accompany Captain Cook on a world-circling expedition, he returned to his native Gloucester to practice and to build up a set of records on simple, clear observations. So cautious was Jenner that he vaccinated no one for 30 years after his undergraduate conception of vaccination. Then came Sarah Nelmes—the source—and James Phipps—the subject. And Jenner's campaign, for he was a campaigner, was launched.

John Hunter had been dead 5 years by the time Jenner was ready to publish the results of his inquiry. Jenner turned to the Royal Society in 1798 for an audience and was rebuffed with the advice that he "should be cautious and prudent ... and ought not to risk his reputation by presenting to the learned body anything which appeared so much at variance with established knowledge, and withal so incredible."

The same advice had been given Franklin by the same body in 1752 when he reported on his derivation of electricity from the clouds. The type of advice offered Jenner, who happens to have been a keen balloonist, was 140 years later to be tendered another aeronaut Frank Whittle, the jet propulsion pioneer, on the grounds that he was still a Cambridge undergraduate and his theory was "incredible."

TUBERCULOSIS

In another area—that of tuberculosis—one is struck by the student contributions of the impecunious, observant, and industrious René Theophile Hyacinthe Laennec. Before graduation in Paris in June 1804, he had written papers on mitral valvular disease and on "inflammation of the peritoneum" under the stern and powerful Dupuytren. He had discovered the subdeltoid bursa and had also shown that hydatid cysts were due to parasites. In March of 1804, he gave an address on what he called "pulmonary tuberculosis," in which he showed "phthisis" to be tuberculosis of the lungs.

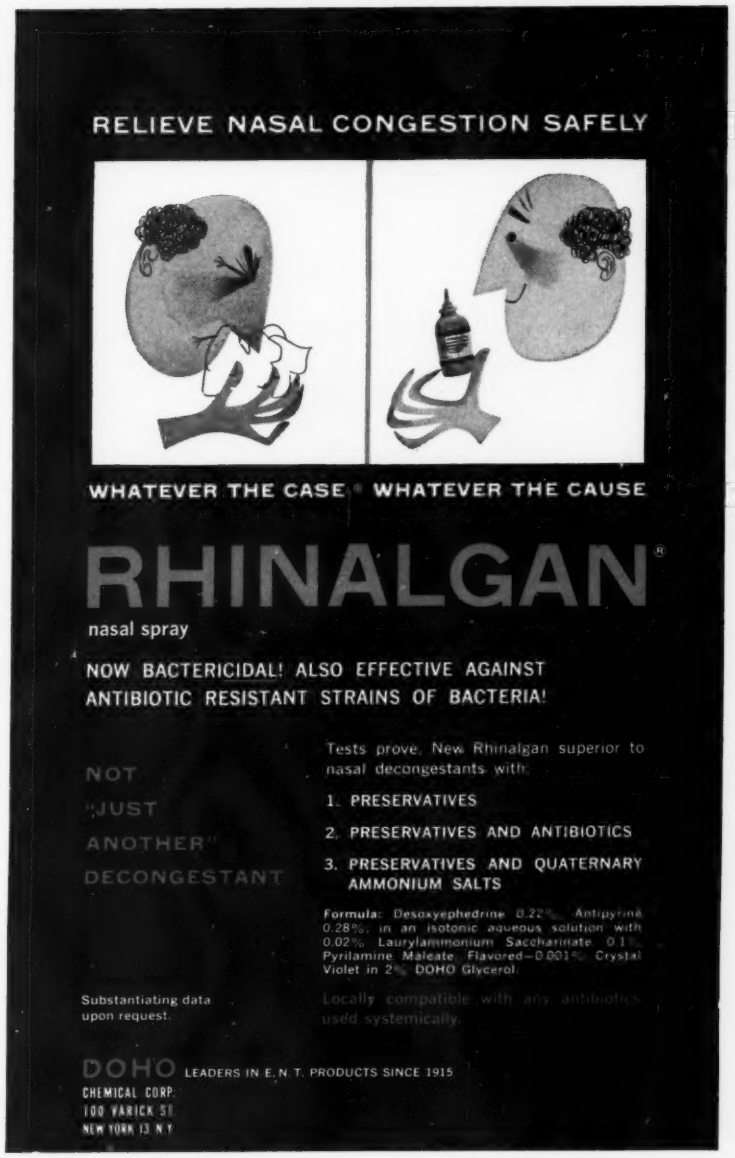
Laennec learned of percussion from Jean-Nicolas Corvisart, who brought this clinical application of an innkeeper's barrel-tapping technique into use 47 years after Leopold Auenbrugger had first described it. Laennec's great book on auscultation appeared in 1819, and by 1825 we find William Stokes, as an Edinburgh medical undergraduate, singing the praises of the method in his book, the first work in English on auscultation, entitled "An Introduction to the Use of the Stethoscope with its Application to the Diagnosis in Disease of the Thoracic Viscera; Including the Pathology of Various Affections."

An unsung American contributor in the history of tuberculosis is James Jackson, Jr., of whom Osler wrote: "Jackson's name . . . will always be associated with the studies on emphysema, and he is the discoverer of the prolonged expiration in pulmonary tuberculosis." As an undergraduate Jackson studied with the great French clinician and pathologist Louis. In 1832 he sent home to New England an article on cholera based upon his experience with Louis in an epidemic in France. While preparing to write his M.D. examinations at Harvard, he was stricken with dysentery and died at the age of 24. Louis' letters to Jackson's father asking if the son could not spend another year in his clinic in Paris are very touching.

Another American pioneer in tuberculosis was James Blake (1815-93). In 1860 he was recommending and practicing the open-air rest treatment in a sanatorium on the summit of Monte Sol in California to the east of Mount St. Helena where Robert Louis Stevenson later lived. Blake's student contribution had been the arranging of the elements into a periodic table on the basis of their physiological effects. This was done when Blake was an undergraduate in London, aged 23. Mendelejeff, usually credited with the periodic table, was 4 years old at the time of Blake's publication. Blake's student discovery was made under the benevolent eye of William Sharpey, as were those by Lister and Huxley.

PUERPERAL FEVER

Ignaz Philipp Semmelweis and Oliver Wendell Holmes had interesting student preparations for their eventual encounter with puerperal fever. As an undergraduate Semmelweis was experimenting on rabbits with tartar emetic, at that time a preferred "remedy" for pneumonia. Holmes, like Semmelweis, had spent a brief apprenticeship in law—a discipline which was to serve them, and humanity, well in the struggle to which their methodical investigation brought them. Holmes began the study of medicine under James Jackson, Sr., in Boston and continued it in Paris, along with Jackson's son already mentioned. In a letter sent to his home in Boston, he alluded to his student "discoveries": "I have more fully learned at least three principles since I have been in Paris: not to take authority when I can have facts; not to guess when I can know; not to think a man must take physic because he is sick. . . . My aim has been to qualify myself . . . not for a mere scholar, for a follower after other men's opinions, for a dependent on their authority—but for the character of a man who has seen and therefore knows, who has thought and therefore has arrived at his own conclusions." Holmes, the Bostonian, a nationally known poet at 21, little suspected that a fiercely independent Hungarian practicing in Vienna unknowingly would be his ally. Holmes' pen was mightier than the swords of his obstetrical compatriots. Semmelweis maintained his doctrine against frightful persecution because he knew he was right and he had the support of his teachers Rokitansky, Skoda, and Hebra.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CELLULAR PATHOLOGY

One of the great concepts introduced in the last century was that of "cellular pathology." Rudolf Virchow as an undergraduate in Berlin decided to test the prevailing theory that inflammation was vascular in origin by studying it in the cornea, a nonvascular tissue. His graduation thesis, written in 1843, was entitled, "De rheumate praesertim corneae." We believe from a letter of 1841 written to his father in the country, asking for more rabbits, that he had been engaged on it at least 2 years prior to graduation. Virchow's student work on the cornea determined his later opinions on the cellular basis of inflammation and doubtlessly influenced his outlook on the fundamentals of pathology.

The distinguished physician-educators Sir James Paget and Sir William Osler were student investigators, strangely enough, in the same field. As an undergraduate at St. Bartholomew's Hospital Medical School, London, Paget in 1835 discovered the cysts of *Trichinella spiralis* in the muscles of the cadaver he was dissecting. In 1870, William Osler, a first-year medical student at the University of Toronto, was removing these trichinae from a cadaver and trying to infect cats, dogs, and rabbits with them. Osler entered medicine with training in the preparation of biological specimens, received at the skilled hands of James Bovell and

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5. Lieberthal, M. M., Conn. State M. J., 19:86, 1955

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Father Johnson at their school in Weston, Ontario. On graduation at McGill Medical Faculty in 1872 his thesis was accompanied by such excellent histological preparations that he was awarded a special prize. Osler's early bent toward pathology was evident throughout his long clinical career. It remained for an undergraduate at Johns Hopkins Medical School, Thomas R. Brown, to discover in 1898 the eosinophilia seen in trichinosis.

David Gruby, the father of medical mycology and discoverer of the cause of favus, was in 1835 an undergraduate protégé of Carl Rokitansky, the celebrated teacher and pathologist at the University of Vienna. Gruby wrote his first paper on "The Morphology of Pathological Fluids." His study concerned the cell forms in pus from different diseases. The story of the hardships faced and overcome by this remarkable spirit are well-nigh unbelievable. He acquired his early schooling by listening outside a classroom from which he was barred on religious grounds. He was apprenticed to a lens grinder, and as a result he was able to make his own microscope when he entered medical school. Despite the fact that he earned his passage through medicine by tutoring, he nevertheless found time for research under Berres and Rokitansky, the latter permitting him to use his "best microscope" for it. Once again does Rokitansky, the teacher of pathology, enter upon our stage.

OROYA FEVER

Daniel Carrion is probably the only medical student in history to have a medical school and several hospitals named after him. Separated as we are by a period of 70 years from his death from Oroya fever, administered to him in the course of his student research project, it is hard for us to realize the impression which his death made on Latin American medical and scientific circles. As early as 1858, a medical student named Tomas Salazar wrote in his graduation thesis, "Historia de las Verrugas," that this disease was waterborne. Since the Conquest it had been regarded as the equal of the "pest," and in the year 1870 alone had taken the lives of 7,000 workmen completing the trans-Andean railroad into Oroya, Peru. Carrion became interested in the problem and during vacations sought out cases and plotted them on a map of the area. Only near Oroya was the disease endemic. The clinical picture of high fever, profound weakness, joint pains, anemia, and leukocytosis was well known, but the cause was still a mystery. Some called it acute pernicious anemia, some atypical malaria, while others said it originated from the hot springs. On August 27, 1885, Carrion, against all advice, received an inoculation of blood from a 14-year-old boy suffering from the typical verruga peruana skin eruption. He was going to prove, once for all, the connection between Oroya fever and verruga peruana. After 3 weeks of excellent health he suffered muscular pains and prostration, with severe anemia. The post mortem was an important contribution to an understanding of the disease. The Peruvian student had answered the question of the connection between the two diseases.

Patrick Playfair Laidlaw as a Cambridge undergraduate, at the turn of the century, carried on an important investigation on hemoglobin derivatives in the biochemical laboratory of Sir Frederick Gowland Hopkins. This set the stage for his postgraduate work on histamine with Sir Henry Dale and for his lifelong researches into distemper and influenza. Hopkins must be listed among those who most encouraged young investigators.

William George MacCallum entered Johns Hopkins Medical School in 1894 bearing a gold medal from the University of Toronto for an important contribution on worm parasites. In his final year as a student at Johns Hopkins he reported on his studies of malarial parasites in birds. He supplied the missing link in the life cycle of the parasite, showing the flagellated form to be the sperm cell. Sir Ronald Ross, who had interpreted it as a flagellated spore escaping from a female cell, wrote years later: "I have ever since felt disgraced as a man of science!" MacCallum's later discovery of the role of the islet cells of the pancreas in diabetes became the springboard for Banting's revolutionary work, aided by the youthful Charles Best. In fact, as we shall see, the islet cells had been discovered by a medical student, Paul Langerhans.

CHEMOTHERAPY

The father of modern chemotherapy, Paul Ehrlich, stated his great side-chain theory as a medical student. Encouraged by one of his teachers, Waldeyer, at Strassburg, Ehrlich began in 1877, by testing the staining qualities of many of the aniline dyes just coming into commercial use in Germany. After transferring to the University of Breslau he had the opportunity of working in the laboratories of Conheim and Heidenhain. While still an undergraduate Ehrlich described, in the *Archives of Microscopic Anatomy,* his experiments on histological staining which brought him to the "idea of a chemical binding of heterogeneous substances to the protoplasm." The rest of Ehrlich's life was spent in developing this great generalization in the fields of immunity, bacteriology, and chemotherapy. The key to Ehrlich's research lay in the aniline dyes, the first of which was synthesized by an 18-year-old English chemistry student William Henry Perkin. Two years later Archibald Scott Couper, as a student in Paris, proposed a valency of four for carbon and showed that it formed long-chain compounds. It took the genius of Ehrlich, a chemist with great stereovisual powers and interest in tissues, to bring together into a fundamental concept all that had gone before.

PUBLIC HEALTH

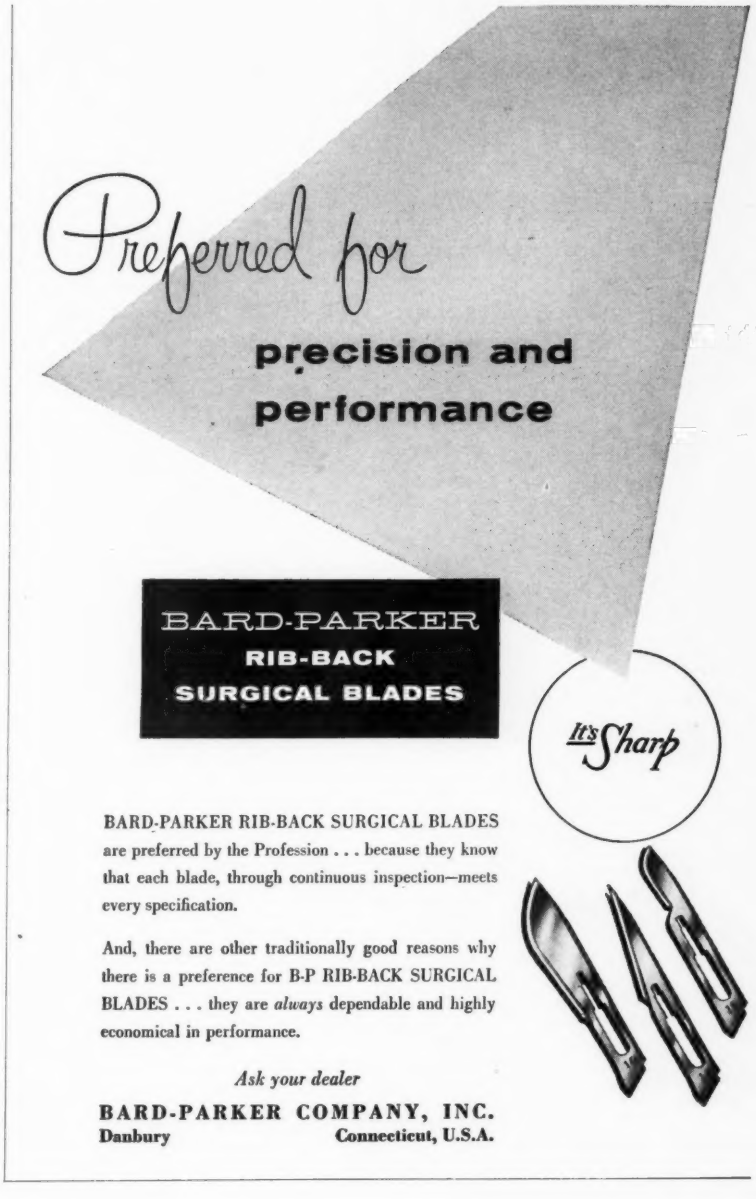
John Shaw Billings has been described as America's greatest contributor to scientific medicine. He was a born inquirer rather than the product of famous teachers. As a student, writing an essay on the surgical treatment of epilepsy, he came to realize the utter lack of any index to the world's medical literature. He lived to remedy this, through the Index Catalogue and its successors in the library of the Surgeon General of the United States Army.

However, our interest in Billings here stems from his campaigns in the fields of sanitation and hospitalization. As an impoverished student at the Medical College of Ohio in Cincinnati from 1858 to 1860, Billings paid his way by serving as caretaker of the dissecting rooms and by "living in" at one of the city's hospitals. This latter appointment caused him to think more about the organization of hospitals—or possibly lack of it—than did contemporary administrators. He found out where things could "go wrong" in institutions and he developed a keen sense of smell with regard to these matters.

It is little wonder that on his first Army posting in the Civil War Billings excoriated Cliffburne General Hospital in Washington, D. C., as being "in an extremely filthy and dilapidated condition—no drainage whatever, . . . no sinks, no water within half a mile." He was later to describe the United States Army as "the best fed and the worst housed" in the world. His suggestions for reorganizing the marine hospitals and his sanitation reports on Army military posts were blunt and forceful. One of his interests was vital statistics, and in 1880 he suggested to the Government that the data compiled from the census "might be recorded on a single card or slip by punching small holes in it, and that these cards might then be sorted and counted by mechanical means according to any selected group of these perforations."

Billings' stimulating influence was to be felt in his work as director of the laboratory of hygiene at the University of Pennsylvania, as designer of the Johns Hopkins and Peter Bent Brigham Hospitals, and in medical education and libraries. When asked how he accomplished so much he replied: "There is nothing really difficult if you only begin. Some people contemplate a task until it looms so big it seems impossible. But I just begin and its gets done somehow. There would be no coral islands if the first bug sat down and began to wonder how the job was to be done."

Thomas "Phenomenon" Young, that many-sided genius who discovered in his first days at medical school that the lens of the eye varies its shape in accommodation was an early constructor of life expectancy tables and of insurance formulas. His first was published in 1826 as "A Formula for Expressing Decrement of Human Life." In his theory of color vision—rediscovered years later by Helmholtz—in his accurate measurements of the size of red and white cells of the blood, in the deciphering of the Rosetta stone, in developing the modulus of elasticity, in setting out a phonetic alphabet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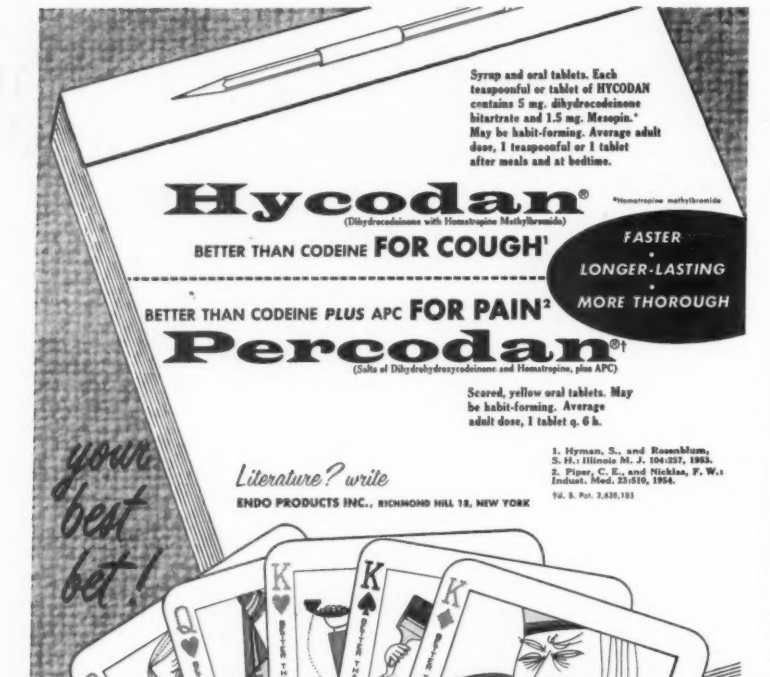
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for all languages, in standardizing the imperial gallon, and in his writings on gaslighting, Young made himself one of the most celebrated scientific contributors of all time. If he were alive today we would find him, doubtless, energizing the Food and Agriculture Organization with reports of his observations on the production of better wool and meat through crossbreeding and of increased food production through irrigation, matters which he studied as a medical student. His drive to understand things was inexhaustible and his capabilities truly Newtonian.

NUTRITION

The field of nutrition reveres the name of Sir Frederick Gowland Hopkins for his early researches on "accessory food factors" which we now call vitamins. Before graduation in medicine, Hopkins published a paper on the pigments in the wings of the English brimstone butterfly. He found the pigment to be a derivative of uric acid and, in his typical way, immediately improved the method for the determination of uric acid. This method was the key to his succeeding researches on nitrogenous compounds. As he investigated the effects of artificial diets composed of purified proteins he became aware of "unidentified accessory food factors" and pursued them, with what great success we all know today.

To follow briefly this lead in nutrition one finds the field of carbohydrate metabolism bristling with student contributors. But, it is the disease diabetes which absorbs us as physicians interested in public health problems. Paul Langerhans discovered his famous "islets" in the pancreas 2 years before he graduated in medicine. Virchow had given him encouragement and laboratory space in 1867, and his graduation thesis, completed in 1869, is an historic document. In 31 pages he described his discovery, adding: "There is indeed hardly another organ in which there is such glaring contrast between the brilliant results of physiological research and the complete darkness in the realm of anatomic knowledge."

The deposition of calcium in the teeth and bones of the body was poorly understood until the Swedish medical student, Ivar Sandstrom, in 1877 discovered the parathyroid glands. True, it remained for W. G. MacCallum and others to demonstrate the physiological principles involved, but Sandstrom's investigation as a 25-year-old student at Uppsala was basic to further progress. His paper was returned to him by a German editor as being too long to publish. The fact is that the paper was so thorough that little has been added to the subject since!

At a time when cardiovascular disease is receiving such attention we would do well to review the student work of Jean L. M. Poiseuille. In 1828 he wrote his M. D. thesis in Paris on "Recherches sur la force du coeur aortique" and in it described his revolutionary mercury manometer for registering blood pressure. Using this instrument he was able to show the rise and fall in the recorded blood pressure with each heart beat, and he actually calculated the degree of dilation of the arteries with each systole.

Aviation medicine has had a number of interesting undergraduate devotees. Alphonse Gal, while a medical student in Italy, served in 1872 on a "mother ship" for sponge divers operating off the Turkish coast. He was the first to describe the itching which goes with "the bends" in deep sea divers. The father of aerial photography, Felix Tournachon, was a medical student. Known as "Nadar," he, like Jenner, was one of the early balloonists. With this reference to the latest specialty we must conclude this account.

Certainly, one thing is clear from this brief review of 2 dozen student contributors of the past: Good seed can be helped greatly by good soil. The determining factor has often been the provision of facilities for a student investigator by a sympathetic teacher. The lesson for us today would seem to be clear. Summer research scholarships in all fields of medicine and its ancillary sciences are likely to repay us handsomely as educators. Encouragement of original work by undergraduates is in the best tradition, as I have tried to show in this paper, and offers one method of offsetting the homogenizing influence of too many specialty boards. Student curiosity can be depended upon to bring to light new facts of major importance, as it has in the past. The shaping of the conditions under which such students will work and grow is a major challenge to all educated people.

APPROACHES TO THE QUALITY OF HOSPITAL CARE*

By Mindel C. Sheps, M.D., M.P.H.†

Increasing attention is being paid to the problems of improving and of appraising the quality of health services in general (*1-8*) and of hospital care in particular. The general problems of measurement and evaluation in all these areas are similar (*9-16*). Basically, they involve finding valid and reliable measurements of quality and interpreting these measurements when made.

PURPOSES OF HOSPITAL EVALUATIONS

Evaluations of hospital quality may have different purposes. The methods and standards selected must be related to the particular purposes for which they are being applied. The most familiar purpose is regulatory. Such an appraisal is designed to match an institution against specified standards that determine its acceptability for the purposes of the regulatory or accrediting agency. It is intended to correct abuses and raise the general level to an acceptable minimum. Various national bodies, now united in the Joint Commission for the Accreditation of Hospitals, have evolved minimum acceptable levels of facilities, equipment, administrative and professional organization, and professional qualifications. They have also made use of some numerical indexes of organization and performance. All of these have been set forth in the commission's Standards for Hospital Accreditation.

The requirements of licensing boards, health insurance funds, and other organizations serve a similar purpose. Regulatory appraisals set minimum or desirable levels by excluding institutions that fail to qualify. At the same time, this provides protection for patients and students who go to acceptable institutions (*17-20*). As yardsticks, these standards have one division that divides hospitals into two classes only—good enough or not good enough.

Improvement of Quality

The second purpose of appraisals is a closely related one—that of serving as a stimulus for the improvement of quality. Licensing and accrediting assessments serve this purpose as well as that of regulation. Hospitals also make self-appraisals for this purpose. The standards used may be minimum or optimum levels, similar to those used for regulatory purposes, or may provide for comparisons among physicians in the same institution. One of the chief instruments for such appraisals has been the medical audit (*21-25*).

The basis of the audit is a review of hospital records according to such criteria as qualitative judgments of the care given and examination of diagnostic errors (*26-29*), as well as such numerical indexes as mortality rates, rates for the incidence of specific complications, removal of normal tissues at operations (*30-32*), consultations, cesarean rates, and the rates for certain tests by diagnostic category. The term "professional service accounting" has been suggested for the compilation of these rates and "medical audit" for their evaluation.

Program Evaluation

The third, and more recently recognized, purpose for quality appraisal, is to study the effects of specific programs or procedures on the quality of care. Generally we may refer to this purpose as program evaluation. Certain procedures, such as clinical-pathological conferences, are believed to improve the quality of hospitals. Large-scale complex programs, such as regionalization, are under trial. It is essential that their effectiveness be examined. We need to know in detail the effect of such procedures on the care received by patients. Program evaluation is the attempt to study this effect, by seeing whether a difference or an improvement in quality is associated with a certain procedure or program.

In other situations the purpose of a program evaluation may be to see whether a certain institution is giving "good" care. Such an appraisal is basically an evaluation in which the judge compares

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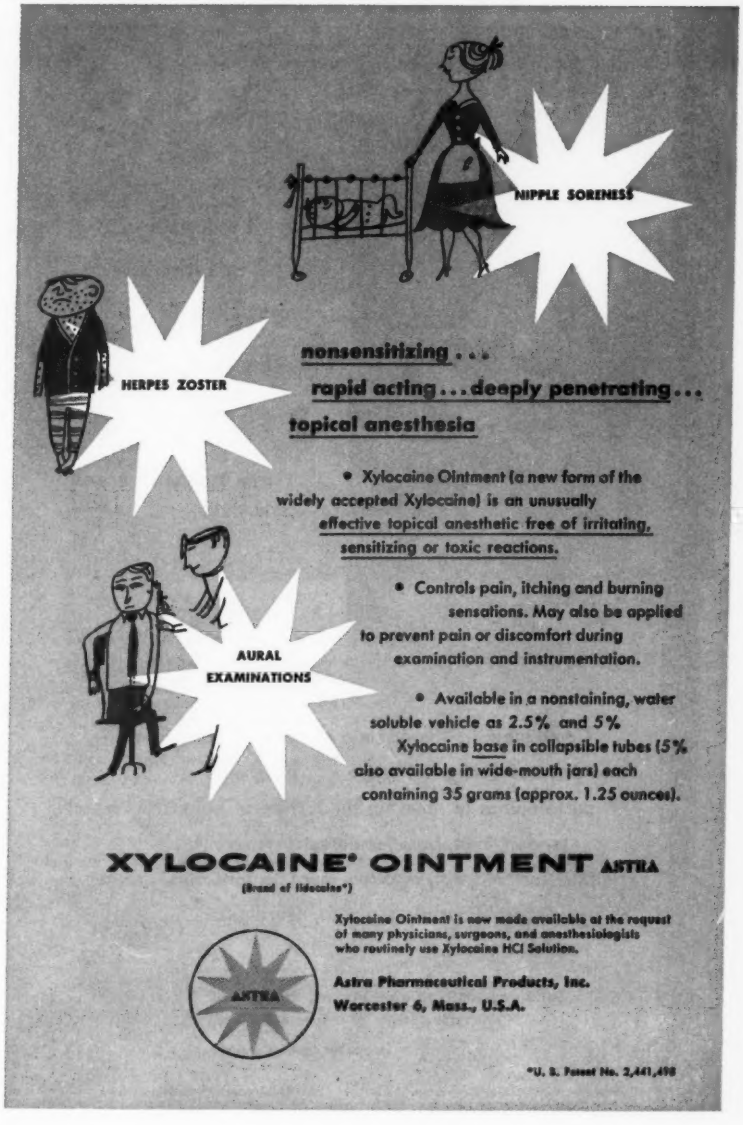
†Dr. Sheps is research associate, department of biostatistics, Harvard School of Public Health, and lecturer on biostatistics, Boston University Medical School. She presented this paper at a joint session of the Medical Care Section of the American Public Health Association and the American Association of Hospital Consultants at the 82d annual meeting of the APHA in Buffalo, October 14, 1954. A news summary of Dr. Sheps' paper appeared in the February 1955 issue of Public Health Reports, p. 198.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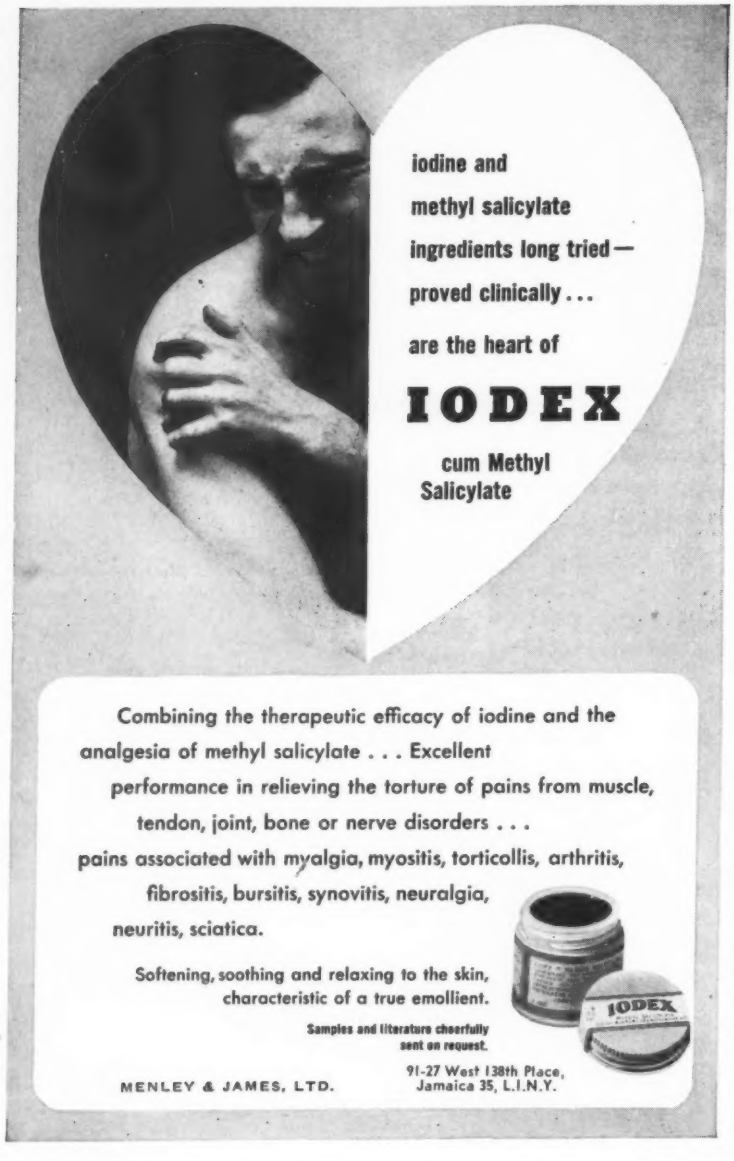
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what he finds with what in his mind seems desirable and possible.

For regulatory purposes, it is desirable to establish criteria which actually do differentiate between acceptable and unacceptable institutions. They must be discriminating at the level where the regulating agency feels the line must be drawn. To help in improving the quality of hospital care, the criteria used must discover the most important problems and reflect progress in meeting them. Criteria used for these purposes may be useful in program evaluation, but more refined measuring tools are also needed. A scale which only says "good enough" or "not good enough" is inadequate. What is needed is a scale that measures values along a continuum extending from one extreme to the other. The measurements used must be sensitive to those aspects of hospital quality that may be affected by the program.

Reference has been made to some of the standard methods in use. It has recently been stated that the statistics used in judging hospitals are "usually meaningless, often illogical and frequently unscientific" (*33*). For example, postoperative mortality ratios are based on deaths within 10 days divided by the total number of operations performed. Thus, deaths after 10 days are omitted, and on the other hand procedures of varying risks, such as dental extractions and neurosurgery, are indiscriminately lumped together.

Moreover, there is a question regarding the validity of the standards by which some of the indexes are evaluated (*33-36*). A top limit of 3 to 4 percent is set for cesarean sections, but current clinical practice and results justify consideration of a higher level. Many of the standards were derived empirically, and their validity was not adequately established. Progress in clinical practice, in any case, calls for frequent revision and revalidation of the standards. The standards to be used, therefore, should be at levels which move according to changing medical knowledge.

The American College of Surgeons and the Professional Activity Study Group in Michigan are cooperating on a new approach to the audit as a measuring device and on the development of new indexes (*36*). A number of new indexes of hospital or medical care have recently been described (*37-39*). Studies currently in progress in the Rochester Regional Hospital Council, the North Carolina General Practice Study, and the Boston Evaluation Study may produce other indexes.

Other methodological developments of interest have been the application of the time study technique to hospital nursing (*40*) and a statistical analysis of the items included in hospital licensing regulations (*41*).

PROBLEMS OF MEASUREMENT

Hospital care is multidimensional. It is a service provided by a coordinated group of professional, technical, and other workers under the direction of a physician. The quality of the care received by patients is affected by the adequacy of the hospital facilities and their maintenance, by the administrative and professional organization of the hospital, by the competence of the personnel, and by the interpersonal relations among the staff as well as between the staff and the patients.

Any consideration of evaluation, therefore, must recognize the large number of factors involved in patient care. It has been frequently suggested that an appraisal form for hospital quality be developed. Some have extended this concept to include deriving a final score or number to represent the quality of a given hospital. Such a composite index would obscure important differences. Moreover, it would be impossible to choose the items to be included and the relative weights for them on a basis that was generally applicable. On the other hand, a number of measurements can be made and each of these allowed to stand by itself, thus producing a profile of the hospital. (*42*). We do not try to represent the health status of an individual by a single figure such as 90 percent of the optimum, but rather, we say something like:

"This patient's health, in general, is excellent, except for mild obesity and a hemoglobin of 10 grams."

Similarly, would it not be meaningful and helpful for the final report of a study to state not that "the quality is good" but rather something of this sort:

"Differences found in the following indexes were highly significant . . . No differences were observed in . . . The

quality of physicians' services was significantly higher . . . The differences in social service were not significant . . ."

An exhaustive discussion of all the aspects of hospital care that could be included in such a profile will not be attempted. Instead it is proposed to deal with some of the methodological problems involved.

The main techniques used in appraisals of hospital quality can be divided into:

- The examination of prerequisites or desiderata for adequate care.
- Indexes of elements of performance.
- Indexes of the effects of care.
- Qualitative clinical evaluations.

By Set Standards of Care

According to the first approach, it is assumed that it is possible to select prerequisites for adequate care and that improvement of these factors leads to improved care. These prerequisites are minimum or optimum levels of facilities, equipment, professional training, and organization. As examples we may mention:

- The provision and appropriate maintenance of adequate physical facilities.
- The existence of special facilities, such as blood bank, bone bank, special laboratory and diagnostic facilities, premature nursery, and artificial kidney.
- An effective organizational structure, both administrative and professional.
- Standards and functioning of service departments such as records, laboratories, and libraries.
- Numbers of personnel by size of hospital—interns, residents, nurses, social workers, physical therapists, nutritionists, technicians.
- The availability of specialized personnel for consultation and of facilities for consultation with others, as in certain regional programs.
- Arrangements for ward rounds, refresher courses, continuing education.
- Minimum qualifications of personnel.
- The existence and functioning of internal controls, such as tissue committee, obstetrical committee, and medical audit.

The use of this approach implies the hypothesis that, given certain facilities and standards, the desirable quality of care is achieved. This hypothesis should be recognized and tested explicitly so that valid criteria can be used in a more informed fashion and to better purpose.

Consideration of the norms used for these desiderata raises such questions as, should they be national averages, regional averages, minimum adequate levels or optimum levels, or, should the search for standards be abandoned and the findings on various hospitals simply compared with each other? The answer depends partly on the purpose of the appraisal. In program evaluation, for example, it may be preferable to use flexible indexes applicable to different types of hospitals and to different periods, rather than to adopt any fixed standard of desirability.

Similar considerations led Stouman and Falk (*10*), in their proposals for international health indexes, to abandon the search for standards. If one has valid measurements for a characteristic, then intelligent, directed application of these measurements in some situations will provide useful information as to their variability and their significance without a norm.

The argument will perhaps be made clearer by an example. When we use an index such as weight of children, we need a knowledge of norms to assist in diagnosis of a particular child. However, if we want to test the effect of a certain vitamin on weight, we need to compare the gains made by children receiving the vitamin and those not receiving it. Knowledge of the norms is here irrelevant.

By Elements of Performance

The second approach to quality uses indexes intended to reflect one or more elements of performance. Indexes may be defined as "one or a set of measures . . . used to measure indirectly the incidence of a characteristic that is not directly measurable" (*43*). Patient care is such a characteristic. Its quality cannot be measured quantitatively, except by the arbitrary allotment of a certain number of points to a qualitative judgment. It is difficult to define; it is complex and intangible. It is therefore natural and logical that much of the effort to evaluate this quality has been focused on the development of indexes, for example:

- Utilization rates for specific procedures by category, such as admission chest X-rays as an index of preventive services, or rectal examination in specified groups of patients.

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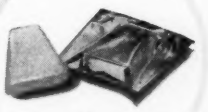

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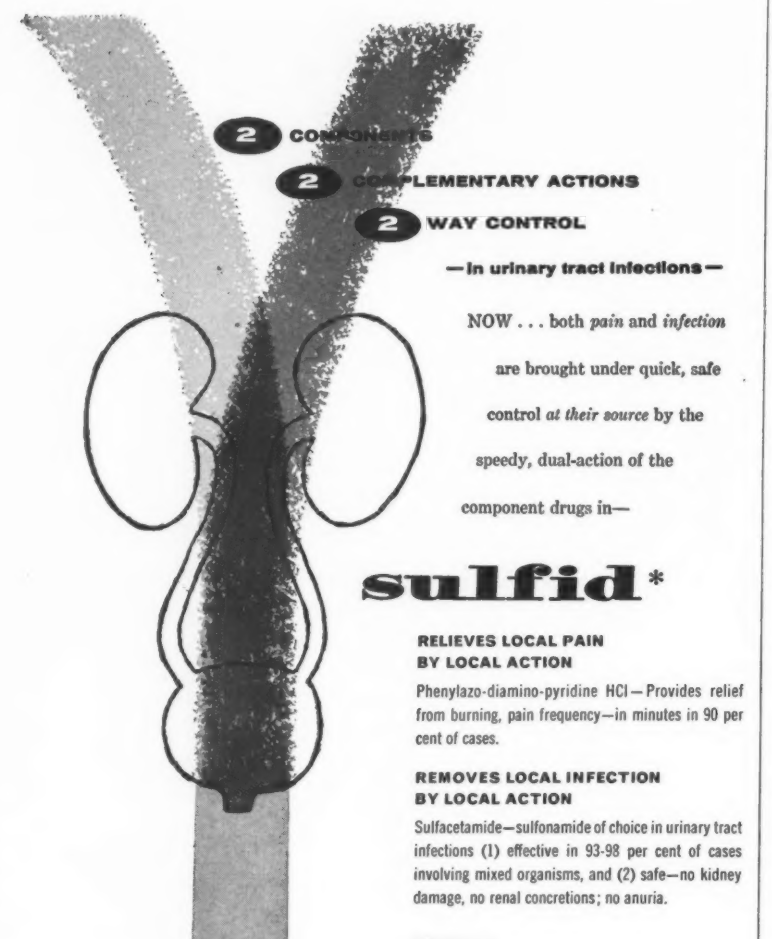
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• Utilization rates of certain laboratory and other diagnostic procedures, by category.
• Indexes which would reflect the promptness and discrimination with which new procedures or drugs are used in the hospital.
• Referral rates and patterns.
• Autopsy rates.
• Cesarean rates.
• Pathological reports on surgical specimens.
• Correlations between preoperative and postoperative diagnoses and between antemortem and post-mortem diagnoses.
• Accuracy of diagnostic procedures.
• Average length of hospital stay by diagnosis. It may be hypothesized that in a well-organized service where the staff members work with purpose and integration, hospital stay will be shorter, on the average, for certain types of cases.
• Listing specific diagnostic and therapeutic procedures expected for each type of case and matching records against them.

Good indexes are objective, reliable, and valid. By the reliability or precision of a measurement, we mean the degree of agreement among repeated measurements of the same things. Numerical indexes, such as rates or ratios, would appear to be relatively precise—anyone counting the number of autopsies done out of all hospital deaths should get the same rate provided that a hospital death is defined without ambiguity. Reliability is more difficult to achieve in indexes that require measurement rather than counting, as has been shown when different physicians measure the same enlarged livers (*44*), or the same reactions to tuberculin tests (*45*). Agreement on interpretation of X-ray films, even when repeated by the same physician, is far from perfect (*46*). Quality indexes that depend on such assessments or on diagnosis, however made, must be tested for precision. It is an error to assume that because they are numerical they are precise.

The use of these performance indexes depends on an assumption that they are valid for an assessment of hospital quality. Presumably this involves the hypotheses (*a*) that each index does measure an element of patient care, and (*b*) that one or a number of these indexes are highly correlated with the intangibles of care. These hypotheses can and should be examined in the light of clinical information and by statistical analysis.

Again, the desirability and validity of the yardstick for these indexes must be examined. We can all agree that the higher the proportion of correct diagnoses, the better the quality of medicine. But what proportion ought we to expect in 1955 in different hospitals?

Other standards are even less definite. There can be too many laboratory tests as well as too few; too few cesareans as well as too many. Discriminating standards would be based on studies of the relation between good patient care and the resultant number of procedures by category of case. The development of appropriate yardsticks thus involves studies to estimate desirable levels for the various indexes and the expected variation. These levels should be adaptable for different types of hospitals and capable of reflecting progress in clinical medicine.

By the Effects of Care

A third approach to appraising hospital quality is the use of indexes intended to measure the effects of quality of care on patient health. The outcome of specific therapy is influenced by many factors in addition to that of treatment, factors such as age, sex, nutrition, stage of the disease, and the emotional state of the patient. The use of these indexes may therefore be highly misleading. It necessitates a careful evaluation of concomitant factors and an attempt to control them.

Some instances of such indexes are in fairly common use. They include:
• Specific mortality ratios such as postoperative, puerperal, and neonatal.
• Survival rates of premature infants in a specified weight range.
• The incidence of preventable complications such as postoperative infections.

These indexes would seem to be relatively precise if their basis is carefully defined. A postoperative mortality rate depends only on the careful definition of postoperative deaths and of the types of surgery counted. However, the validity of this rate as an index of the quality of surgery would still need to be established. The definitions used are highly relevant

to this validity. But even then questions remain:

Does the death rate within 10 days after major chest surgery really reflect the quality of care?

What about the effect of such patient characteristics as diagnosis, complicating illnesses, age, sex, and nutritional status?

Objective indexes of the kinds discussed therefore require careful definition and evaluation. They hold considerable promise for the appraisal of hospital quality, but they are not yet the ideal measuring tools. At best, they are indirect and partial indicators of the basically intangible characteristic with which we are concerned. In a given organizational setting, with access to given standards of consultation and services, doing a certain number of laboratory examinations, one can have numerous shades in the range of quality of care, depending on the skill, the judgment, the experience and the character of the persons involved and on their relationships with patients. This end product is what one really is trying to evaluate in any assessment of patient care. It is for this reason that some workers have tackled the problem of evaluating quality directly through the fourth approach, namely a clinical evaluation.

By Clinical Evaluations

Makover (*47*) included a clinical evaluation in his study of medical groups associated with the Health Insurance Plan of New York. The continuing HIP evaluation program has adapted some of his techniques as well as adding new ones. According to a preliminary unpublished report by M. A. Morehead, delivered at the 1954 New England regional meeting of the American Public Health Association, records from six clinical fields are selected and scores assigned on the completeness of records, diagnostic management, treatment, and reporting. Although performance is measured against prepared standards, the final score depends on the judgment of the consultant making the evaluation.

More recently, another type of combined appraisal was made by Goldmann and Graham (*48*). To an analysis of the availability of service and utilization of service, they added qualitative ratings of the efficiency of service organization and of a random sample of patient records.

Clinical evaluations are in the end subjective and thus less precise than some of the indexes previously discussed. However, they may be more valid since they are a direct approach to the characteristic we want to evaluate, the quality of patient care. Quality, though intangible, is not an abstraction. Nor is judgment of quality capricious or a purely personal whim. While agreement could not be expected to be complete, there are, in numerous situations, widely accepted concepts of what is meant by good care.

The reliability of qualitative judgments can be tested, and they can be subjected to statistical analysis (*49-51*). To make relatively precise estimates of quality, it is necessary to have the findings of several independent judges. This permits an assessment of the degree of agreement among judges (*52, 53*); it allows for an objective test of the reliability of the evaluations and diminishes the effect of individual bias. Although more difficult than assessing the precision of interpretations of objective tests, it is the same in principle.

At times, agreement on judgmental evaluation is better than agreement on definitions and criteria. Reynolds (*44*) describes such a case. A group of clinicians attempting to outline criteria for ambulation of patients with infectious hepatitis could not reach agreement after a lengthy discussion of weighting procedures. But analysis of "paired comparisons" by which each man gave his preferences between the criteria in all possible combinations of two, resulted in good agreement on the ranks to be assigned them. Thus, it may be that several clinicians would agree more readily on the relative ranks of a number of hospitals than they would on the weights to be given various objective indexes in computing a quality score.

Judgmental assessments are resorted to in other fields. In some food industry situations the taste of a product must be evaluated. Objective tests give some information, but to answer the important question, "how does a particular process affect the taste," one must in the end re-

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*Combes, F. C. & Canizares, O.: New York St. J. Med. 52:706, 1952; Marsh, W. C.: U. S. Armed Forces M. J. 1:1045, 1950.

sort to tasting the food. If it is necessary to study the effect of different ingredients and preparation procedures on the palatability of ice cream, the only way out is to ask a number of judges which product tastes better to them.

From such tests, valid results may be obtained notwithstanding the problems related to nonagreement among a group of judges and the lack of consistency on the part of an individual judge. The validity is also dependent on such controls as randomization of the tests and the judge's ignorance of which particular product he is testing.

Accordingly, it would appear that appropriate experimental and statistical procedures would enable more meaningful results to be obtained from qualitative evaluation of hospital care. In general, qualitative judgments are expressed through either ranking or scoring.

In ranking, a number of units are placed by each judge in order of his preference and the various ranks analyzed for consistency.

In scoring, a scale of quality is established, and each judge assigns the score that he considers appropriate.

These techniques may be combined in various ways. Thus, individual scores can be given on quality in different clinical fields, and the findings combined into one overall score. The subjects may then be ranked according to the scores obtained.

As already emphasized, the use of these techniques depends on replication, that is, on securing at least two separate evaluations of the same set of units. This is not the same as asking a committee to make a combined appraisal. Only through separate evaluations is it possible to assess the consistency of the individual judgments and to arrive at a relatively unbiased estimate. The value assigned results from combining the different judgments, and is more reliable and objective than the opinion of a single individual. A committee of experts would emerge with one final appraisal, but this would not allow the internal checking suggested. It is even possible with such a panel that one or two members could influence the others so that the final assessment would not be truly a consensus.

If qualitative appraisals of hospital care are made, the particular aspect of care to be studied might be medical, surgical, obstetrical, nursing, social work, or a combination of these and others. Well-qualified, experienced practitioners in the field under study should make the evaluation. Although most clinicians, medical and other, would probably prefer to base their opinions on actual observations of patient care, a properly selected random sample of clinical records may provide adequate information. If various clinical fields were reviewed, replication would be desirable in each field. The evaluations in the major clinical fields could then be crosschecked to test the consistency among them.

It is obvious that such qualitative judgments would have meaning only as comparisons among different hospitals or subdivisions of hospitals. The rank or score would have no absolute value but merely a relative value within the groups appraised. Direct comparisons are unavoidable when we operate without a scale or yardstick. However, this only makes explicit the fact that comparison lies at the basis of all measurement. Measurement has been defined as "the assignment of numerals to things so as to represent facts and conventions about them . . . under a consistent set of rules" (*54*).

The operations to which any measurements can be subjected depend on the rules that can be made and on the validity and reliability of the values obtained. However, with any measurements we make comparisons. If we measure height, we compare the height of the subject with the markings on an arbitrary scale. These markings have meaning only in terms of established norms, of earlier results on the same subject, or of readings obtained from another subject. When we don't have a ruler, we can stand two subjects next to each other and make the comparison directly. Similarly, any index of quality may be measured against a yardstick, or the values obtained on several hospitals may be directly compared.

THE BASIS OF COMPARISON

Any of the four approaches to quality, therefore, involve comparisons, either indirectly through the use of standards or directly. In program evaluations the basis of comparison is vital. If a spe-

cific procedure has an effect on quality, it must be revealed in differences. To find such differences, the hospital under study must be compared with something, either with other hospitals or with itself before inception of the program. When differences exist, it is of paramount importance to isolate differences related to the program itself from differences owing to such other factors as changes in time, economic differences, cultural differences, and so on. The selection of a basis of comparison or control is crucial in this attempt.

The basis of comparison and the indexes to be used, in fact the plan for evaluation of a new procedure or program, should go hand in hand with planning the program itself. Ideally, before the new procedure is instituted, several similar hospitals would be chosen. By random selection, half would become experimental units for the new program, and half, controls (*55*). A careful study of patient care would be made in all the hospitals before instituting the new program and again at a suitable time after the program was in effect. Medical and social progress occurring during this period might produce changes in both experimental and control units. But the changes might be different, and it is these changes that would be compared.

Such an experiment would be relatively simple if it tested only one procedure at a time. Thus one could, for example, estimate the effect of providing small hospitals with special courses for laboratory technicians by comparing changes in the accuracy of their results in certain procedures. More complex programs should also be amenable to this type of experiment.

However, there are cases where this does not apply. The effects of an existing program are to be evaluated, or a hospital plans to embark on a new program, and a study is to be made of quality before and after. The institutions then are self-selected and thereby are different from other hospitals. The before-and-after case does not make the problem simpler. A comparison within the one hospital at two different periods necessitates control of secular changes related to the passage of time or changes owing to extraneous factors that may have come into play.

This situation has parallels in population studies, in public health research, and in clinical research. Analytical studies of what exists, rather than of a planned experiment, call for a more critical evaluation of the findings, and the conclusions must be more tentative. This is even truer when the analyses are retrospective, being made after the fact (*56-59*). However, in some cases it may be possible to select suitable controls for comparison (*60*) and to test their suitability by an examination of variables that might affect the result. The careful selection and critical analysis of the controls (*61*) are basic to the validity of the findings.

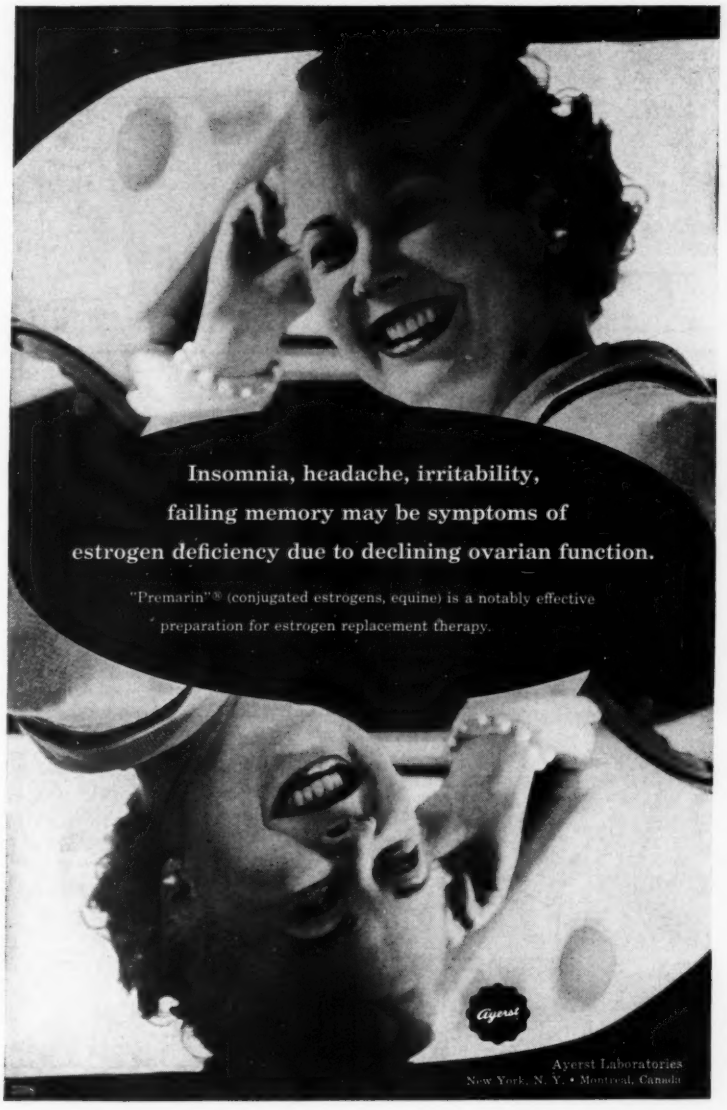
An important step in program evaluation, therefore, is the search for suitable controls and for methods of eliminating some of the many variables that affect the quality of care. This is especially difficult because hospitals are highly complex institutions, and patient care is an intangible quality, influenced by many variables.

It is therefore possible that no comparable units could be found for nonexperimental situations. In the event of failure to establish acceptable controls, or even as a complement to comparisons made with controls, there is another avenue of approach that might prove fruitful. One might formulate a hypothesis such as:

"Characteristic x is usually found only in teaching hospitals. A random sample of nonteaching hospitals in comparable communities will show low values for x, but an examination of hospitals in our group will reveal significantly higher values."

Characteristic x might be laboratory services of a certain type, or rehabilitation services, or one of the quantitative indexes considered. Such an approach, of course, adopts the rest of the country as controls. As in other situations, purely descriptive studies may be used as a basis for planning future experiments.

Many references have already been made to testing the validity of various indexes. This could be done in various ways. One would be through a statistically controlled clinical analysis of each index. Another would be through seeking correlations among various measurements (*37, 62*) including qualitative appraisals. Thus, correlations might be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sought among two or more measurements which are believed to measure practically the same thing. It might be found that a relatively simple, inexpensive objective test showed a high correlation with the results of the qualitative judgments, or, more likely, that a combination of such tests did so. Once the validity and applicability of such indicators were established, there would be many instances where they could be used instead of more difficult, expensive, and cumbersome techniques.

CONCLUSIONS

Most of the work done to date in the appraisal of hospital quality has been related to the purposes of correcting abuses, setting minimum standards, and stimulating improvements in quality. The field of program evaluation is just beginning to be explored.

Techniques used in quality evaluations vary with the purposes of the particular study. The quality of care can be evaluated through a multidimensional approach which results in a profile of the hospital. The main basis of the appraisal can be the use of one or a combination of: examinations for prerequisites for good care, indexes intended to measure elements of performance, indexes intended to measure the effect of care by results obtained, and qualitative clinical judgments.

Any indexes and standards used in such appraisals would be clearly defined, based on comparable data, and examined for their reliability and validity. Qualitative clinical appraisals should also be tested in a similar fashion and statistical controls and analysis applied to them as well.

Correlations among different indexes and judgments used should be attempted.

Appraisals which are intended to examine the effects of specific procedures or programs should be planned before the inception of the program.

The selection of an appropriate basis of comparison is crucial to program evaluation.

The development of practical and valid methods of measurement will involve the expenditure of considerable money and time. However, in view of efforts and money now being spent on programs to raise quality, it would seem essential to direct some of those resources toward the development of appropriate methods with which to judge their effects. Collaboration of clinicians, administrators, and statisticians is necessary for such a development.

A critical analysis of the particular methods used should be an explicit objective of a quality evaluation.

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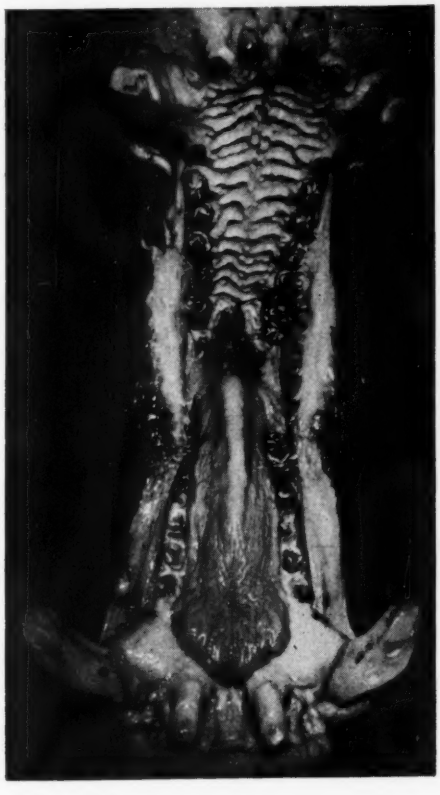

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GAINS IN LONGEVITY ARE COUNTRYWIDE*

The average length of life increased substantially in every region of the United States during the 1940's, according to life tables computed by the Statistical Bureau of the Metropolitan Life Insurance Company on the basis of the mortality for the general population in 1939-41 and 1949-51. The complete details for 1949-51, including tables for the nonwhite population, will appear in a report to be published by the National Office of Vital Statistics.†

The best record for longevity at the midcentury, as a decade earlier, was made by the West North Central States. In 1949-51, the expectation of life at birth in this area was 67.8 years for white males and 73.3 years for white females, an increase of 2.6 and 4.1 years, respectively, since 1939-41. Even greater were the gains scored in the other geographic divisions, the most rapid progress being made in the areas which had had the least favorable record. Thus, in the Mountain States, where the average lifetime was lowest in 1939-41, the gains in the decade amounted to 4.4 years for white males and no less than 5.9 years for white females.

Although the areas varied in the extent to which longevity improved, their ranking with regard to average length of life did not change appreciably in the decade. However, the geographic variations narrowed considerably. In 1949-51, the expectation of life at birth for white males ranged from 67.8 years in the West North Central States to 65.4 years in the Mountain States, a difference of 2.4 years; a decade earlier the corresponding disparity was 4.2 years. For white females, the advantage of the West North Central States over the area with the least favorable record (the Mountain States in 1939-41 and the Middle Atlantic States in 1949-51) decreased from 3.2 years to 2.1 years.

In 1949-51, the rank of the geographic divisions according to expectation of life at the adult ages was, in almost all instances, different from that based upon longevity at birth. Thus New England, which ranked high with regard to expectation of life at birth for white males, was near the bottom of the list with respect to the years of life remaining at the adult ages. A contrary situation is observed for the West South Central States. This area is surpassed only by the West North Central States for expectation of life among white males at ages 25 and 45; at age 65 it leads every section of the country. For white females, the West South Central States have the best record at each of these ages.

The mortality rates show a pattern similar to that already noted for expectation of life. Marked declines in mor-

*Reprinted from *Statistical Bulletin*, Metropolitan Life Insurance Company, September, 1955.

†The earlier report, *State and Regional Life Tables, 1939-41*, was published under the same auspices.

tality have occurred in every section of the country, but considerable geographic differences continue to exist at every age period. In the first year of life, the experience is most favorable in the New England area, where infant mortality in 1949-51 was 27.1 per 1,000 live births for white males and 20.9 for white females. At the other extreme, in the West South Central and Mountain States, infant mortality was approximately two fifths higher. It is a striking fact that even the geographic divisions with the poorest records in 1949-51 had lower infant mortality rates than did the best area a decade earlier.

Until midlife is reached, the mortality in the Middle Atlantic States compares favorably with that in other divisions, but at the older ages the residents of that area are increasingly at a disadvantage. At age 65, the Middle Atlantic States make the poorest showing; the New England States do only slightly better, in sharp contrast with their minimum death rates for infants. The West South Central States, on the other hand, have a much more favorable position for mortality past midlife than at the younger ages.

REDUCTION IN MORTALITY PAST MIDLIFE*

The last two decades have witnessed a marked reduction in mortality at the ages past midlife. Among white women in the age range 45-74 insured under Industrial policies in the Metropolitan Life Insurance Company, the age-adjusted death rate from all causes combined fell from 21.6 per 1,000 in 1935 to 12.2 in 1954, or nearly 45 percent. The corresponding decrease among white men was appreciably smaller, from 29.9 to 22.5 per 1,000, or 25 percent. In each sex, the relative improvement in mortality was somewhat greater at ages 45-54 than at the later ages. Except for minor fluctuations in the early years of World War II, the curves are remarkably smooth.

The infectious diseases have recorded the most rapid reductions in mortality, reflecting the revolutionary advances made in the treatment of these diseases with the newer drugs and the antibiotics. In this insurance experience, the death rate from pneumonia and influenza among white women at ages 45-54 dropped from 55.1 to only 6.6 per 100,000, or nearly 90 percent, between 1935-39 and 1950-54; even at ages 65-74 the decrease was 80 percent. White men experienced almost as favorable a trend as women in the range of ages from 45 through 74.

Tuberculosis is another outstanding example of an infectious disease which has increasingly been coming under control, particularly in very recent years. Although the relative reduction in mortality from this cause between 1935-39 and 1950-54 decreased with age, it nevertheless amounted to 70 percent among white women policyholders at ages 65-74. Among the men, the decreases, while very substantial, were appreciably smaller; at ages 65-74 the percent decline in the tuberculosis death rate among men was only half that among women. The tuberculosis problem that still remains is becoming more and more concentrated among men at the older ages.

Considerable progress has also been made in reducing the mortality from the cardiovascular-renal diseases past midlife. The decrease was about 30 percent among white women in each of the age groups within the 45-74 range. Among white men, curiously enough, the improvement in the death rate from these diseases was greatest (16 percent) at ages 65-74, but it amounted to only 5 percent at ages 55-64; at ages 45-54 there was actually somewhat of an increase, from 541.8 to 580.4 per 100,000 between 1935-39 and 1950-54. In each sex, the cardiovascular-renal diseases constitute a large and increasing proportion of the total mortality at ages 45 and over; at ages 65-74, the proportion now exceeds three fifths.

It is encouraging that in the period under review the mortality from the malignant neoplasms (cancer and allied conditions) decreased fully one sixth

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1. Astrup, T., et al.: Acta Physiol. Scand. 14: 195, 1947.

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among insured white women in the range of ages from 45 through 74. In contrast, the death rate from this cause among white men increased 9 percent at age groups 45-54 and 55-64; however, at ages 65-74 the rise was only 1 percent. The adverse experience for the men reflects the sharp upward trend in the recorded mortality from cancer of the respiratory system. It is apparent that the death rate from malignant neoplasms other than respiratory decreased in each of the three age periods among men as well as among women. The largest increase in the death rate from respiratory cancer among white females was 50 percent, and occurred at ages 65-74, whereas the smallest rise among white men—at ages 45-54—exceeded 100 percent; at ages 65-74 the increase was practically 240 percent between 1935-39 and 1950-54.

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Books Received

Books received for review during the period from November 5 to December 5, 1955, are listed below. Reviews will be published as space permits.

THE CORNEA. By Charles I Thomas, M.D., Fellow, The American College of Surgeons; Fellow, The American Academy of Ophthalmology and Otolaryngology; Associate Clinical Professor of Ophthalmology, Department of Surgery, Western Reserve University, School of Medicine; Associate Ophthalmologist, Department of Surgery, University Hospitals of Cleveland, Cleveland, Ohio. Cloth. Pp. 1318, with illustrations. Price $30.00. Charles C Thomas, Publisher, 301-327 E. Lawrence Ave., Springfield, Ill., 1955.

MODERN TRENDS IN OBSTETRICS AND GYNAECOLOGY (2nd Series). Edited by Kenneth Bowes, M.D., M.S. (Lond.), M.B., Ch.B.(L'pool), F.R.C.S., F.R.C.O.G., Obstetric Physician, St. Thomas's Hospital; Surgeon, Grosvenor Hospital for Women, London; Consultant Gynaecologist, S.W. London Regional Metropolitan Board; Examiner to the Examining Board in England; Sometime Examiner, University of London. Cloth. Pp. 407, with illustrations. Price $12.00. Paul B. Hoeber, Medical Book Department of Harper & Brothers, 49 E. 33rd St., New York 16, 1955.

SUBACUTE BACTERIAL ENDOCARDITIS. By Andrew Kerr, Jr., M.D., Assistant Professor of Medicine, Louisiana State University School of Medicine; Visiting Physician, Charity Hospital of Louisiana at New Orleans. Cloth. Pp. 343. Price $6.50. Charles C Thomas, Publisher, 301-327 E. Lawrence Ave., Springfield, Ill., 1955.

OF RESEARCH PEOPLE. By George E. Burch, M.D., F.A.C.P., Henderson Professor of Medicine, Tulane University School of Medicine, New Orleans, Louisiana. Paper. Pp. 56, with illustrations. Price $3.00. Grune & Stratton, 381 Fourth Ave., New York 16, 1955.

FUNCTIONAL OTOLOGY. The Practice of Audiology. By Morris F. Heller, M.D., Assistant Attending Otolaryngologist for Audiology, Chief of the Audiology Clinic, The Mount Sinai Hospital, New York; with Bernard M. Anderman, M.A., and Ellis E. Singer, M.A. Cloth. Pp. 225, with illustrations. Price $5.50. Springer Publishing Company, 44 E. 23rd St., New York 10, 1955.

THE TREATMENT OF RENAL FAILURE. Therapeutic Principles in the Management of Acute and Chronic Uremia. By John P. Merrill, M.D., Associate in Medicine, Harvard Medical School and Peter Bent Brigham Hospital; Established Investigator, American Heart Association. Cloth. Pp. 238, with illustrations. Price $6.75. Grune & Stratton, 381 Fourth Ave., New York 16, 1955.

COMPLICATIONS OF REGIONAL ANESTHESIA. Etiology—Signs and Symptoms—Treatment. By Daniel C. Moore, M.D., Director, Department of Anesthesiology, Mason Clinic; Chief of Anesthesia, Virginia Mason Hospital, Seattle, Washington. Cloth. Pp. 291, with illustrations. Price $10.50. Charles C Thomas, Publisher, 301-327 E. Lawrence Ave., Springfield, Ill., 1955.

PRACTICAL NEUROLOGY. By Leo M. Davidoff, M.D., Professor and Chairman, Department of Surgery of the Albert Einstein College of Medicine; Director of Surgery, Bronx Municipal Hospital Center; Chief of Neurosurgery, Mount Sinai Hospital, New York, N.Y.; and Emanuel H. Feiring, M.D., Associate Professor of Surgery (Neurosurgery), Albert Einstein College of Medicine; Visiting Surgeon (Neurosurgery), Bronx Municipal Hospital Center; Associate Neurosurgeon, Mount Sinai Hospital, New York, N.Y. Cloth. Pp. 442. Price $7.00. McGraw-Hill Book Company, 330 W. 42nd St., New York 36, 1955.

THROMBOEMBOLIC DISEASE. By Geza De Takats, M.D., M.S., F.A.C.S., Division of Vascular Surgery, Department of Surgery, University of Illinois College of Medicine Research and Educational Hospital; St. Luke's Hospital, Chicago, Illinois. Paper. Pp. 55. Price $2.25. Charles C Thomas, Publisher, 301-327 E. Lawrence Ave., Springfield, Ill., 1955.

ATLAS OF GENERAL SURGERY. By Joseph R. Wilder, M.D., Assistant Professor of Surgery, The New York Medical College, Flower and Fifth Avenue Hospitals; Assistant Attending, Metropolitan Hospital and The Bird S. Coler Hospital, New York City; Formerly, Chief of the Surgical Services, The United States Air Force Hospital, Wright-Patterson Air Force Base, Dayton, Ohio. Cloth. Pp. 222, with illustrations. Price $13.50. The C. V. Mosby Company, 3207 Washington Blvd., St. Louis 3, 1955.

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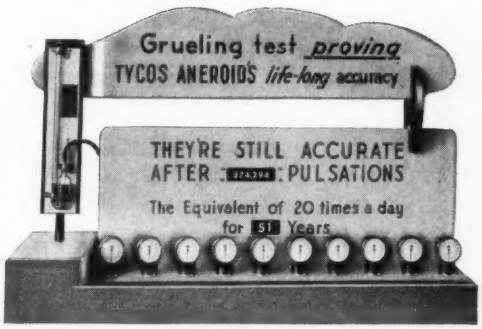

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CHANGES OF ADDRESS AND NEW LOCATIONS

Anderson, Leon, KCOS '55; Oklahoma Osteopathic Hospital, 744 W. Ninth St., Tulsa 5, Okla.

Anderson, Yolanda M., from 12523 Third Ave., to 1843 Lancaster Ave., Detroit 36, Mich.

Attarian, Archie B., from Quakertown, Pa., to 244 S. Grand Ave., Fowlerville, Mich.

Baker, J. Dal, from 206 Pythian Bldg., to 209 Thompson Bldg., Tulsa 14, Okla.

Baldwin, Homer Ellsworth, from Skiatook, Okla., to 807 S. Denver Ave., Tulsa 5, Okla.

Barrette, Roger A., from 2851 Clyde Park Ave., S. W., to 3592 Clyde Park Ave., S. W., Grand Rapids 8, Mich.

Baumeier, Arlo P., KCOS '55; Lakeside Hospital, 2801 Flora Ave., Kansas City 9, Mo.

Beck, Raymond E., from 2215 Milan St., to 1917B Pecos St., Amarillo, Texas

Behnke, Allen W., KCOS '55; Parkview Hospital, 1920 Parkwood Ave., Toledo 2, Ohio

Bershas, Marvin, CCO '55; 3323 Pasadena Ave., Detroit 38, Mich.

Blumberg, Harris, PCO '55; Bay View Hospital, 23200 Lake Road, Bay Village, Ohio

Bondurant, Dale P., from Cushing, Okla., to Stevens Park Osteopathic Hospital, 1141 N. Hampton Road, Dallas 11, Texas

Boone, Richard F., from Tampa, Fla., to 951 Ryan Road, Dallas 8, Texas

Brady, John T., from Loving, N. Mex., to Lathrop Osteopathic Hospital, 310 N. Canal St., Carlsbad, N. Mex.

Bragg, Jackson B., from Daytona Beach, Fla., to 1600 N. Ridgewood Ave., Holly Hill, Fla.

Brinklow, Howard K., from 1009-11 Harvey Bldg., to 432 30th St., West Palm Beach, Fla.

Brown, Allen T., from 223 Diamond, to 723 S. Catalina, Redondo Beach, Calif.

Burke, John T., KCOS '55; Route 3, Grove City, Pa.

Burns, Donald G., KCOS '55; Route 1, Franklin, Ohio

Caleel, George T., CCO '55; Chicago Osteopathic Hospital, 5250 S. Ellis Ave., Chicago 15, Ill.

Callison, Richard W., DMS '55; Charles E. Still Osteopathic Hospital, 1201 S. Madison St., Jefferson City, Mo.

Canter, Stanley, KC '55; Cape Osteopathic Hospital, 105 S. Spanish St., Cape Girardeau, Mo.

Cavendish, Carl L., from Montgomery, W. Va., to Route 2, Alderson, W. Va.

Clayton, Robert E., KC '55; Amarillo Osteopathic Hospital, Inc., 801 W. Tenth St., Amarillo, Texas

Cole, Kenneth L., KC '55; Carp Lake, Mich.

Conrad, Ernest C., from 40 Hassen Bldg., to 414 W. Muskogee, Box 240, Sulphur, Okla.

Cortum, Donald, from 223 Diamond, to 723 S. Catalina, Redondo Beach, Calif.

d'Ablaing, Gerrit, III, COPS '54; Los Angeles County Osteopathic Hospital, 1100 N. Mission Road, Los Angeles 33, Calif.

Diltz, Elmer F., KC '55; 918 Lockbourne Ave., Columbus 6, Ohio

Doyne, Martin, KC '55; Bay View Hospital, 23200 Lake Road, Bay Village, Ohio

Drew, Edward G., from Waterville, Maine, to China, Maine

Dybedahl, Paul W., from 1204 N. W. 20th St., to 714 Morgan Bldg., Portland 5, Ore.

Dygert, C. W., from 304 E. Wayne St., to 306 E. Wayne St., Fort Wayne 2, Ind.

Edelman, Eugene J., from 8501 N. W. 22nd Ave., to 8640 N. W. 22nd Ave., Miami 47, Fla.
Edinger, Albert G., Jr., from Los Angeles, Calif., to 1613 S. Elena, Redondo Beach, Calif.
Erickson, Adolph A., from 219 E. Valley Blvd., to 225 E. Las Tunas Drive, San Gabriel, Calif.
Evans, Albert S., KCOS '55; 616 W. Jefferson St., Kirksville, Mo.
Evans, Perry W., KC '55; Oklahoma Osteopathic Hospital, 744 W. Ninth St., Tulsa 5, Okla.
Farnham, G. M., from Bronson, Mich., to 22111 Stephenson Highway, Hazel Park, Mich.
Farrow, Charles Durrett, Jr., from 48th & Spruce Sts., to 315 S. 50th St., Philadelphia 43, Pa.
Fasnacht, Richard S., from Erie, Pa., to 2737 Springfield Road, Broomall, Pa.
Feldman, Raymond K., from Detroit, Mich., to 11903 Santa Monica Blvd., Los Angeles 25, Calif.
Fiel, Nicholas J., KCOS '55; Houston Osteopathic Hospital, 5115 Montrose Blvd., Houston 6, Texas
Fields, Bernard L., from Los Angeles, Calif., to 6343 Eastern Ave., Bell Gardens, Calif.
Fineman, Bill L., CCO '55; Detroit Osteopathic Hospital, 12523 Third Ave., Detroit 3, Mich.
Finnell, Charles F., KCOS '55; 801 E. Normal Ave., Kirksville, Mo.
Frantzich, Otto A., from Los Angeles, Calif., to 15640 S. Normandie Ave., Gardena, Calif.
Fredericks, Homer M., from 544 E. Speedway, to 540 E. Speedway, Tucson, Ariz.
Freitas, William J., from Edina, Mo., to New Cambria, Mo.
Furnish, Richard D., Jr., from Los Angeles, Calif., to 5718 Hollywood Blvd., Hollywood 28, Calif.
Gard, Charles A., from St. Louis, Mo., to 1036 Park Ave., Box 85, Lakeview, Ohio
Gardiner, John B., KC '55; 1581 Neil Ave., Columbus 1, Ohio
Garnett, Martha, from 417 Fincastle Bldg., to 2829 Brownsboro Road, Louisville 6, Ky.
Geller, Raymond N., from Arcadia, Calif., to 225 E. Las Tunas Drive, San Gabriel, Calif.
Gerard, Jack G., KCOS '55; Mount Clemens General Hospital, Macomb at North, Mount Clemens, Mich.
Gibson, C. W., KC '55; Edina, Mo.
Gillon, Robert H., DMS '55; 6719 N. 17th St., Philadelphia 26, Pa.
Gingrich, Miles E., Jr., KCOS '55; Traverse City Osteopathic Hospital, Traverse City, Mich.
Grebe, Kurt H., DMS '55; 507 N. Michigan Ave., Saginaw, Mich.
Green, Robert A., from Miami, Fla., to 92 Henlopen Ave., Rehoboth Beach, Del.
Grimaldi, Mario N., from Philadelphia, Pa., to 2 Dorset Drive, Lawrence Park, Broomall, Pa.
Hailer, William L., CCO '55; Riverside Osteopathic Hospital, 165 George St., Trenton, Mich.
Harman, Dan C., from 109 N. Wabash Ave., to 111 N. Wabash Ave., Chicago 2, Ill.
Hathaway, Bryce H., from 112 W. Johnson, to 132 E. Wyandot, Upper Sandusky, Ohio
Haynes, Harvey L., from Augusta, Mo., to Minden, Nev.
Heberle, Clement K., from 701 N. Atlantic Ave., to 179 Broadway, Daytona Beach, Fla.
Hedeen, M. Sidney, from 1593 University Ave., to 1595 Selby Ave., St. Paul 4, Minn.
Henry, Owen I., from Dayton, Ohio, to Detroit Osteopathic Hospital, 12523 Third Ave., Detroit 3, Mich.
Herzog, Eugene C., Jr., from 1087 Dennison Ave., to 399 W. Rich St., Columbus 22, Ohio
Himelberger, Corydon G., from Riverside, Calif., to 3272 West Road, Trenton, Mich.
Hoffman, Roy G., CCO '55; 226 Fisher Road, Grosse Pointe 30, Mich.
Houske, Chesley R., from 1425 Marcelina Ave., to 2516 Torrance Blvd., Torrance, Calif.
Hoversten, Lester, from West Berlin, Wilmersdorf, Germany, to 14 Granville Gardens, Jesmond, Newcastle on Tyne, England
Irving, B. Lee, from Royal Oak, Mich., to 744 S. Main St., Clawson, Mich.
Jackson, George E., Jr., from 13643 Linwood Ave., to 8507 W. Eight Mile Road, Detroit 21, Mich.
Jones, Floyd C., KC '55; Detroit Osteopathic Hospital, 12523 Third Ave., Detroit 3, Mich.
Jones, James W., from Myrtle Creek, Ore., to Riddle, Ore.
Keane, Thomas J., from 8969 Lewis Ave., to 8967 Lewis Ave., Temperance, Mich.
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Klucka, A. Robert, from Oak Park, Mich., to 18525 Mitchell Ave., Detroit 34, Mich.
Knorr, C. Reynolds, KCOS '55; Normandy Osteopathic Hospital, 7840 Natural Bridge Road, St. Louis 21, Mo.
Kowalenko, Alex T., KC '55; Osteopathic Hospital of Kansas City, 926 E. 11th St., Kansas City 6, Mo.
Kroll, George V., PCO '54; 3932 Shaw Blvd., Westminster, Colo.
Kurtzack, Irwin J., DMS '55; Art Centre Hospital, 5435 Woodward Ave., Detroit 2, Mich.
Lewis, Norvin W., Jr., KC '55; 472 Highland Ave., Kansas City 6, Mo.
Lieberman, Isadore, from 6538 N. 18th St., to 7600 Thouron Ave., Philadelphia 38, Pa.
Littell, Charles A., KC '55; Green Cross General Hospital, 1900 23rd St., Cuyahoga Falls, Ohio
Loignon, Henri P., KC '55; Oklahoma Osteopathic Hospital, 744 W. Ninth St., Tulsa 5, Okla.
Lowrie, Fred T., from Gardena, Calif., to 2225 Via La Brea, Palos Verdes Estates, Calif.
Lucid, David P., KC '55; Art Centre Hospital, 5435 Woodward Ave., Detroit 2, Mich.
Mandel, Bert A., PCO '55; Metropolitan Hospital, 300 Spruce St., Philadelphia 6, Pa.
Mangurian, Peter, Jr., COPS '54; 1007 N. Berendo St., Los Angeles 29, Calif.
Marshall, Thomas E., from Orlando, Fla., to Crescent City Clinic, Crescent City, Fla.
Maxwell, James W., KC '55; 2600 Smart Ave., Kansas City 24, Mo.
McCorkle, Robert O., KC '55; Blackwood-Mims Clinic & Hospital, Comanche, Texas
McKinley, Daniel W., from 24905 Gratiot Ave., to 17000 Ten Mile Road, East Detroit, Mich.
McQuiston, Robert E., DMS '55; 40 Union Ave., Ecorse 29, Mich.
Mercer, Richard H., KCOS '55; Green Cross General Hospital, 1900 23rd St., Cuyahoga Falls, Ohio
Mickey, L. Dale, KCOS '55; 1009 E. Washington St., Kirksville, Mo.
Montgomery, James Willis, KCOS '55; 803 S. Lincoln St., Kirksville, Mo.
Moss, Stanley R., from Los Angeles, Calif., to 1650 N. Ogden Drive, Hollywood 46, Calif.

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Nelson, E. Stanley, from Columbus, Ohio, to 915 Fifth Ave., Des Moines 14, Iowa
Neufeld, Carl L., KC '55; Doctors Hospital, 1087 Dennison Ave., Columbus 1, Ohio
Parry, Frank J., from Detroit, Mich., to 24917 Van Dyke, Center Line, Mich.
Passias, John James, KCOS '55; Doctors Hospital, 1087 Dennison Ave., Columbus 1, Ohio
Payne, William H., from 205 S. Fifth St., to 213½ W. Reed St., Moberly, Mo.
Pearsall, L. M., from 422 First Natl. Bank Bldg., to 127B Jefferson, N. E., Albuquerque, N. Mex.
Pelino, Donald G., CCO '55; Detroit Osteopathic Hospital, 12523 Third Ave., Detroit 3, Mich.
Pelino, Frank D., KC '55; 79 Robin St., Providence 8, R. I.
Perloff, Reuben M., from Hollywood, Calif., to 800 N. Virgil Ave., Los Angeles 29, Calif.
Perraud, Robert L., from Trenton, Mich., to 3141 S. W. Davis Blvd., Fort Lauderdale, Fla.
Person, William C., from 113 W. "D" Ave., to 536 E. Glendale Ave., Glendale, Ariz.
Piserchio, John, Jr., KC '55; Rocky Mountain Osteopathic Hospital, 4701 E. Ninth Ave., Denver 20, Colo.
Rasak, Mitchell Louie, KC '55; 18974 Murray Hill, Detroit 35, Mich.
Reider, Daniel R., CCO '55; Chicago Osteopathic Hospital, 5250 E. Ellis Ave., Chicago 15, Ill.
Reuter, Edward C., from Appleton, Wis., to Garden City Osteopathic Hospital, 30548 Ford Road, Garden City, Mich.
Reynierse, Peter C., from 115 W. Liberty St., to 212 W. Columbia St., Farmington, Mo.
Riccitelli, A. T., Jr., from Montebello, Calif., to 9450 Van Nuys Blvd., Van Nuys, Calif.
Richhart, Don R., from Hollywood, Calif., to 105 Washington Ave., Oildale, Calif.
Riemann, Paul L., Jr., KC '55; Grandview Hospital, 405 Grand Ave., Dayton 5, Ohio
Riley, Nannie B., from 1810 Ashwood Ave., to 3712 Richland Ave., Nashville 5, Tenn.
Robinson, David, from 9204 S. 51st Ave., to 9500 S. 50th Court, Oak Lawn, Ill.
Robinson, John A., KC '55; 3011A Independence Ave., Kansas City 24, Mo.
Robone, Lawrence J., from 804 S. Victory Blvd., to 716 S. Victory Blvd., Burbank, Calif.
Roitz, Antone John, from Mound City, Kans., to 6533 Lexington Ave., Hollywood 38, Calif.
Rosenbaum, Robert R., from New York, N. Y., to Metropolitan Hospital, 300 Spruce St., Philadelphia 6, Pa.
Roth, Gilbert, CCO '55; 1979 Glynn Court, Detroit 6, Mich.
Rust, Harvey G., from Arcadia, Calif., to 9060 E. Huntington Drive, San Gabriel, Calif.
Schenz, John W., KC '55; 2255 W. Broad St., Columbus 4, Ohio
Schmitt, Allen Dean, from St. Jo, Texas, to Route 2, Buffalo, Mo.
Schulman, Samuel Louis, from Detroit, Mich., to McDowell General Hospital, 31 E. McDowell Road, Phoenix 22, Ariz.
Seutter, Wayne M., KCOS '55; Traverse City Osteopathic Hospital, Traverse City, Mich.
Shealy, Edward M., from Albuquerque, N. Mex., to Phoenix Osteopathic Hospital, 4004 N. Seventh St., Phoenix 43, Ariz.
Sheridan, Donald E., Jr., from 85 Western Ave., to 48 Elm St., Waterville, Maine
Shtasel, Philip, from New York, N. Y., to Metropolitan Hospital, 300 Spruce St., Philadelphia 6, Pa.
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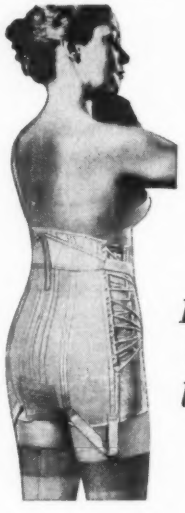

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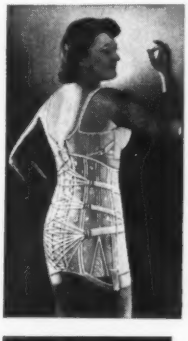

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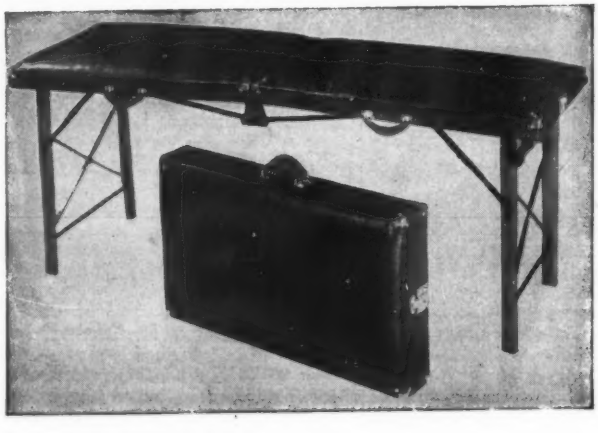

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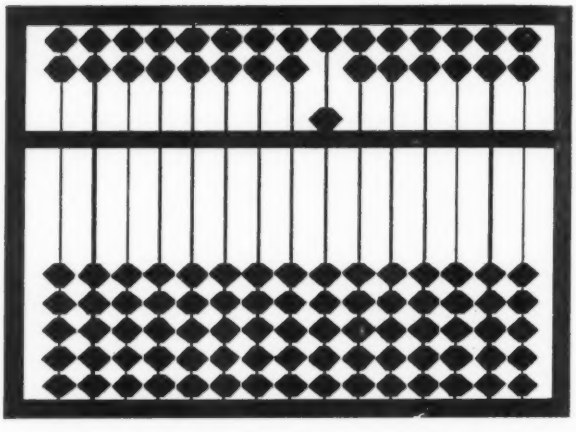

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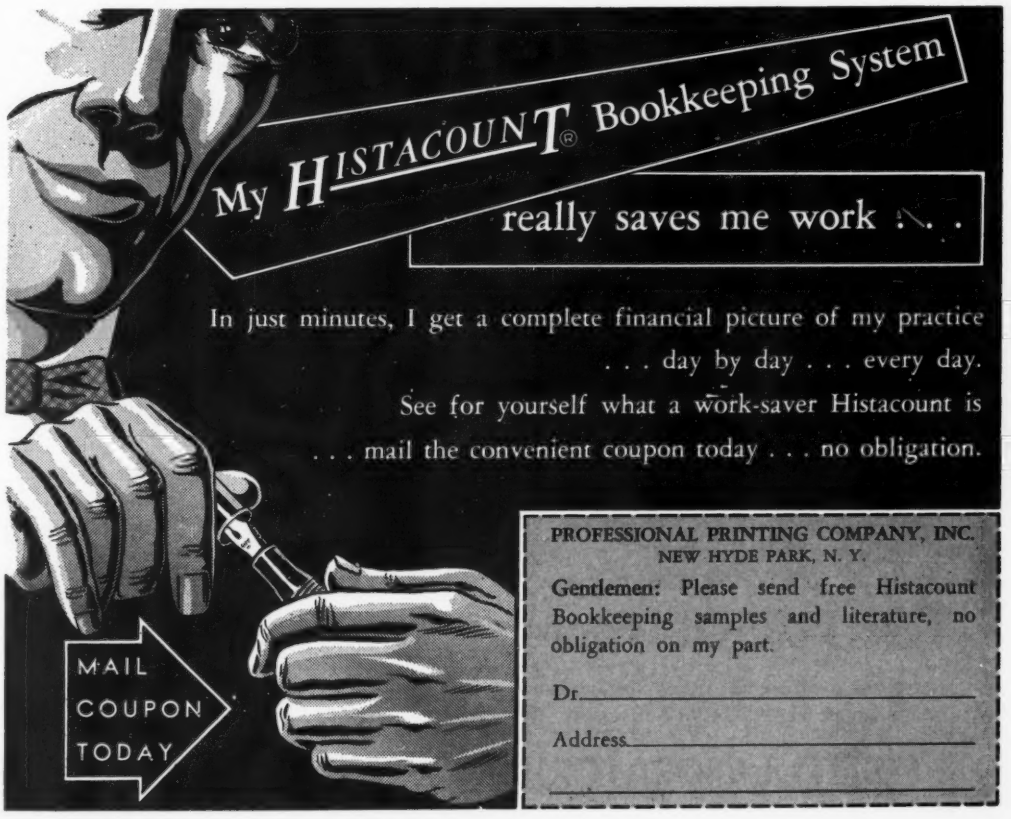
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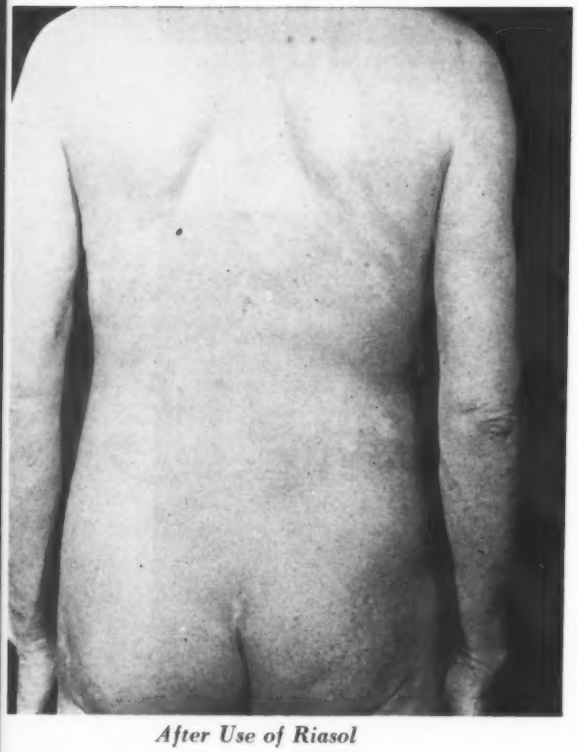

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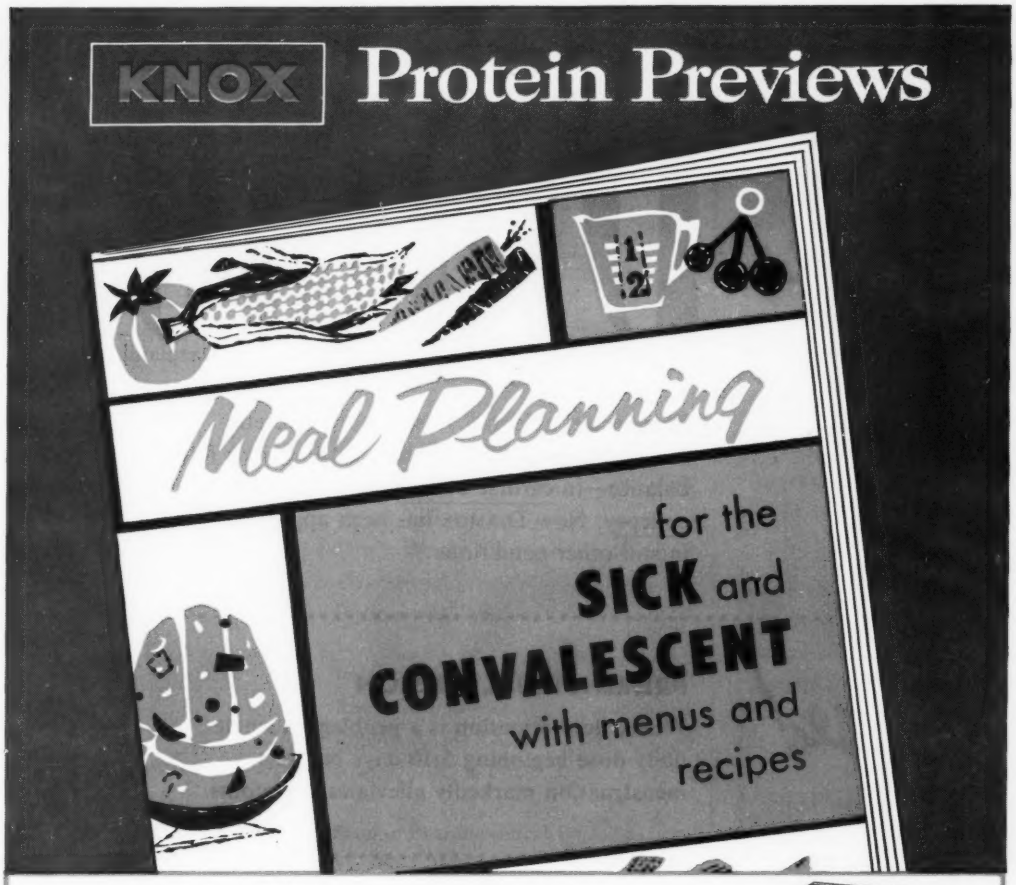

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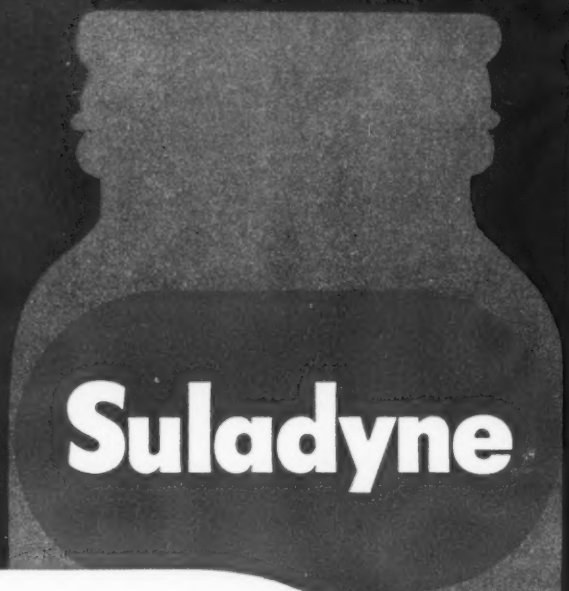

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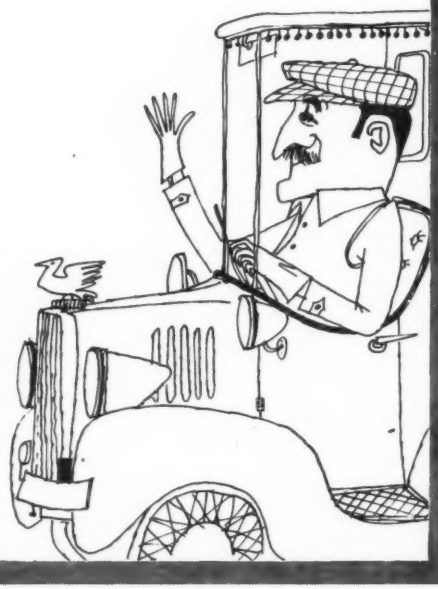

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